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BIENNIAL REPORT

OF THE

DEPARTMENT OF PUBLIC HEALTH

State of Tennessee

FOR THE FISCAL YEARS

1926-1927

NASHVILLE, TENNESSEE

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ERRATA

Page 19, "Vital Statistics", Column "Expended", for $29,720.00 read $29,720.42.

Page 19, "Child Hygiene", Column "Totals", for $140,092.00 read $142,092.00.

Page 23, "Sample Budget", Line "Contingent Fund", Column "Total", for 780 read 680.

Page 26, "Sample Budget". The last two columns should read as follows:

County and Local Sources	Total
$750	$1500
390	780
160	320
$1300	$2600

Page 34, Add after last line, "Absence or maximum correction of physical defects".

Page 61, "Tuberculosis - All Forms", line "1926", Column "Total", for 3525 read 3625.

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LETTER OF TRANSMITTAL

Tennessee State Department of Public Health,
Office of the Commissioner,
Nashville, Tennessee.

Sir: In accordance with the law, I have the honor to transmit herewith the report of the Department of Public Health for the period of July 1, 1925, to June 30, 1927.

Respectfully,

E. L. Bishop,
Commissioner.

To His Excellency, The Governor of Tennessee.

GENERAL POLICY

The useable wealth of a commonwealth is made up of the sum of its natural resources, multiplied by its physical or vital resources. Natural resources are fixed; vital resources are variable and may be increased or decreased by the causes and conditions responsible for health or disease. If disease be held to a minimum and health developed to a maximum, the community may develop its natural resources into useable wealth and prosper. If the community be disease ridden, useable wealth is held to a minimum by relative inability to develop the natural resources. Hence, effective application of the principles of preventive medicine in the prevention of disease and the promotion of health pays real dividends in the economy and public welfare of the community.

There is, therefore, no more fundamental responsibility of government considered from the economic point of view only, than the responsibility to serve and to protect the public health. The question is: How may this responsibility be discharged best? Certainly there must be an organization to act as the agency of government in fulfilling this responsibility just as other governmental organizations act in fulfillment of their governmental responsibilities. Preferably, organization for health work must follow the usual lines of governmental organization.

There are three elements of government in America; federal, state and local. Each unit of government should discharge that part of the responsibility which its powers and station in the whole scheme of government especially qualifies it to fulfill. In Tennessee, we are concerned primarily with the duties and functions of health organization for the state and its local units of government. Until comparatively recent years, except in the case of the larger municipalities of the country, the local governments had not been taken seriously into account, neither had their functions been well defined by public health administrators. This was a fundamental error for ours is a country of local self-government and it is the local governments which should, therefore, have the larger responsibility in the direct rendition of public health service.

Our form of county government readily lends itself to a policy of decentralized administration of public health activity.

The State Department of Public Health in Tennessee is committed to a policy which recognizes local responsibility for public health activity and that the health program for the state as a whole must be built on a solid foundation of well organized effective local full-time health departments organized under trained leadership and manned by trained personnel. Trained leadership and personnel is vitally essential since in this day and age the prevention of disease and the promotion of health can be obtained only by the application of specific measures.

The state government cannot possibly maintain an organization reaching every individual and protecting every community with adequate service. Such an organization would fall of its own weight. Not only is this true, but in this country of local self-government such a situation would not and should not be tolerated. We expect no such service from any other state department. With this policy in mind, the State Department of Public Health has provided for the largest possible extension of local rural health organization through the development of full-time county departments of health. Subsequent sections of this report will show sound advance in this phase of activity.

The second major element of policy of the State Department of Public Health is that it shall so organize its own activity as to render expert consultant service to local departments of public health and act as a coordinating influence in the development of a common program of activity and high standards of service for local health agencies. The central organization of the State Department of Public Health should grow only as the demand for consultant service and supervisory activity increases, and discharge added responsibilities in regard to activities common to the state as a whole. The functions and powers delegated to the State Department of Public Health provide that the department shall have general supervision of the interest relating to the health and lives of the people of the state, prescribe rules and regulations for the prevention of epidemic diseases together with rules and regulations which shall be carried into effect by local health departments, establish quarantine when essential and make sanitary investigations necessary to the improvement of public health. Hence, in addition to its responsibility for the development, promotion and coordination of full-time local health service, the department has responsibilities which are discharged through units of activity concerned with the registration and analysis of vital statistics, investigation and control of preventable diseases, rendition of public health laboratory service, and sanitary engineering activity.

The third major element of policy under which the department is operating provides that our activity shall be carried out insofar as possible by leadership rather than compulsion. Under certain conditions, it, of course, becomes necessary for the department to compel compliance with its regulations or with the statutes since otherwise the public interest would be endangered. These occasions, however, can be held to an essential minimum as is evidenced by the fact that during the biennium covered in this report, the department has not engaged in a single prosecution despite the fact that its power is probably less limited than that of any other department of the state government. Constructive advance must be made through leadership and not by compulsion and this element of policy is, therefore, infinitely more important than its mere statement indicates.

The fourth principal element in departmental policy recognizes the fundamental contribution to public health progress which can be made by the practicing physician. It has been well said that the practicing physician is an essential arm of preventive medicine. In point of fact, no public health program can succeed unless it receives the assistance and support of practicing physicians. This department is, therefore, developing its policy and practice in such manner as to invite the cooperation of practicing physicians, and in the near future, will request the State Medical Association to appoint an advisory committee which can act as a connecting link between the State Department of Public Health and the Association.

ACKNOWLEDGMENTS

Grateful acknowledgment is expressed for the splendid cooperation extended by public officials, state and local health workers, both official and non-official, the medical, dental and nursing professions and the many other civic and professional organizations which have manifested such an active interest in the promotion of public health and the welfare of the department. The State Department of Public Health and the citizens of Tennessee owe a special debt of gratitude for assistance rendered by extra-state agencies as follows: U. S. Public Health Service for general consultation service and on which no monetary value can be placed, the loan of trained personnel to supervise the development of local health organizations, financial assistance towards county health work and the maintenance of the Trachoma Hospital at Knoxville; U. S. Children's Bureau for financial aid towards maternal and child welfare activities; U. S. Census Bureau especially for its advice and personnel which were the determining factors in securing the admission of Tennessee to the U. S. Registration Area for Births; the International Health Board of the Rockefeller Foundation for financial aid to county health work, epidemiology, the development of laboratory service, and study fellowships granted to members of state and local health department staffs; the Commonwealth Fund for the Child Health Demonstration in Rutherford County; the American Social Hygiene Association for financial aid and consultation service in venereal disease control; and the American Red Cross for its work in disaster relief.

SUMMARY

HEALTH CONDITIONS

During the year 1926, 56,103 births and 31,409 deaths were recorded; the births being in excess of the deaths by 24,694. During the period 1917 to 1926 inclusive the birth rate increased from 21.9 per thousand to 22.7 per thousand, and the death rate fell from 13.5 per thousand to 12.7 per thousand. Throughout the period, however, the colored rate has been nearly twice that of the white. There has been a general downward trend in most of the communicable and preventable diseases. The typhoid fever rate, for example, dropped from 38.3 per hundred thousand to 25.0 per hundred thousand. Malaria decreased from 20.4 per hundred thousand to 6.1 per hundred thousand, and is now confined to a group of counties along the Mississippi river and some of its tributaries. Diphtheria has decreased from 15.0 per hundred thousand to 11.3 per hundred thousand. It is still, however, quite a problem in the state, affecting principally children under 10 years of age, in which age group, 94 per cent of the deaths occurred, and on further analysis it is found that 75 per cent of the deaths occurred below 5 years of age. There has been a gradual decrease in tuberculosis, but still the rate is 146.9 or better than 60 per cent in excess of that of the Registration Area of the United States. A very remarkable decrease has also occurred in diarrhea and enteritis under 2 years of age. In 1917, the death rate was 73.0 while in 1926 it is 38.4. The decrease in the intervening period has been gradual, indicating that the decrease can very largely be attributed to improvement in sanitation and the improvement of child care. Cancer has increased nearly 50 per cent. Heart disease shows an increase although not quite so great. Automobile accidents are now becoming a principal cause of death. In 1917 the death rate was 2.8 per hundred thousand and has gradually risen to 12.4 in 1926. In the cities the rate is now approximately three times what it was in 1917, while in the rural areas it is seven times greater. Homicide shows a tendency to increase. During 1926, 404 persons were killed by their fellow men, the rate being 16.4 per hundred thousand. There has been a slight downward trend in maternal mortality, yet throughout the ten year period under consideration, the rate continues around 8 per thousand live births.

During 1926, 382 women lost their lives from childbirth. While this rate compares quite favorably with that of the Registration Area of the United States, yet it is far in excess of other countries having a well organized maternal welfare program reaching all people. As will be seen in other sections of the report, following the establishment of organized health service in a given area, death rates from preventable diseases show a definite downward tendency. The prevention of many diseases has now been placed upon a definite basis and experience has repeatedly demonstrated that their ravages can be controlled by the institution of modern health service.

During the latter part of 1926 and the early part of 1927, two major disasters visited the state; one due to an overflow of the Cumberland river and another to the overflow of the Mississippi river. Both pellagra and malaria increased to a considerable extent following these disasters, the former being due to an economic disturbance and the latter due to the great amount of water and the increase in mosquito breeding. In the affected area, however, organized health service was established and during the summer following the flood, both of these diseases were brought under control; and with the program now in operation, they should be brought below the normal incidence for the areas under consideration.

ADMINISTRATION

Formerly, the department had its activities rather loosely grouped in a number of divisions, some of which had legal status while others existed only by authority of the department which in itself was not sufficient. Under the terms of the new appropriation, the activities have been grouped into the following divisions: (1) Division of Administration; (2) Division of Local Organization; (3) Division of Epidemiology; (4) Division of Vital Statistics; (5) Division of Laboratories; (6) Division of Sanitary Engineering; (7) Division of Child Hygiene and Public Health Nursing; (8) Division of Health Education.

Under the authority granted the department heads by the bill for the reorganization of state government, the Division of Epidemiology which formerly was combined with the Division of Local Organization was separated and the function of each consolidated under the proper executive head. The business of the department as nearly as possible has been consolidated under the direct charge of the Commissioner of Health. All vouchers, requisitions and accounts are issued by the Division of Administration and the responsibility for supplies, accounts, budgets and similar items is vested directly in an accountant, who has been added to the department. This has materially simplified the work of other divisions and has eliminated much lost motion and prevented considerable duplication of work.

Weekly conferences are held at which the problems of the various divisions of the department are discussed and a great deal of mutual benefit derived. By this means, members of the staff are kept advised of the activities of other divisions. Material is being prepared which will contain information concerning the activities of the various divisions and their relationship to one another, to other state departments and extra-state organizations.

The appropriation for the State Department of Public Health prior to the beginning of the current fiscal period was $77,320 per annum. This was approximately 3.3 cents per capita for public health work and was the lowest per capita expenditure in the South and the lowest but one of all the forty-eight states. The annual appropriation for this fiscal period is $122,417. This is slightly more than 5.2 cents per capita per annum. The increase in available state appropriations has resulted in increased amounts of money from sources outside the state. Extra-state funds are now available to this department at the rate of $55,000 per annum in addition to the state appropriation, thus making possible material expansion in all the activities.

DIVISION OF LOCAL ORGANIZATION

This division has replaced the former Division of Rural Sanitation which consisted of a director and office clerk and which had the administration of a small fund for the development of full-time county health service. The division now consists of a director, associate and office clerk and has at its disposal a fund of $24,000 per annum for cooperation in the development of full-time county health service. The first county health department was organized in 1919; the number has increased to fourteen. Two additional counties have employed full-time sanitary officers. At the present time, 95.95 per cent of the urban population is under the protection of full-time city health departments; 22.81 per cent of the rural population is under the protection of county health departments and 7.67 per cent of the rural population is under the protection of a modified form of full-time local health service, either that given by a sanitary officer or a public health nurse. Hence, 30.48 per cent of the total rural population is served by some kind of local full-time health service. The grand total of the population of Tennessee under some form of full-time local health service is 1,063,429, or 43.73 per cent of the total population of the state including both rural and urban and based on the 1924 population estimates. While there has been a very commendable increase in the rural population placed under the protection of full-time health service, yet 69.52 per cent remains to be provided with modern health service.

EPIDEMIOLOGY

This is a newly established division. Despite the fact that the study and control of communicable diseases is one of the basic functions of a state health department, there has been in the past no specific individual or division responsible for this work. The only service possible in communicable disease control prior to the beginning of the present fiscal period was that which could be given more or less at random by the Commissioner and his associates, all of whom had other definite duties. This division will be in position to make possible the collection of morbidity reports that are worth while, to investigate and control outbreaks of communicable diseases, to study and define communicable disease problems and to devise control measures that will be effective. A wholly new method for the collection of reports of communicable diseases has been worked out by this division in cooperation with the U. S. Public Health Service. The efficiency of this method is demonstrated by the fact that there has been an even lower percentage of delinquency in the reports from health jurisdictions than has been the case with reports from vital statistics registration districts. The communicable disease regulations have undergone a thorough revision and have been brought into line with modern public health practice. In these regulations more latitude is granted the local health organizations in the control of communicable diseases. In addition to its general program, this division is beginning special educational activities in the field of venereal disease control by the assignment of a nurse especially trained in this work. In cooperation with the International Health Board of the Rockefeller Foundation, an intensive study of hookworm was conducted with a view to defining the problem. The study revealed that hookworm disease as a public health problem is now limited to a few counties in the Cumberland plateau and the Unaka mountain range. A similar study of malaria was made, and as a result we now know that the problem in the main is confined to certain counties bordering on the Mississippi river and its tributaries. A study of typhoid fever has revealed that the major problem lies in towns of 500 to 1,000 population, particularly those not supplied with pure water and the proper method of sewage disposal. A similar study concerning the prevalence of simple goiter is now in progress. In cooperation with the U. S. Public Health Service, the hospital for the treatment of trachoma has been continued at Knoxville. A large percentage of persons afflicted with trachoma will ultimately lose their eyesight unless proper treatment can be instituted. As a general rule, this disease afflicts persons who are least able to pay for the prolonged and expensive treatment necessary for the cure.

VITAL STATISTICS

The whole procedure of the Division of Vital Statistics has been revised and modern methods introduced. There were two fundamental weaknesses in this division; first, the routine handling of birth and death certificates in the office was cumbersome, resulting in much lost time and duplication of effort. It was not possible to secure tabulation of births and deaths until some three to six months past the end of the year for which they were collected. Birth certificates and death certificates are now bound in the office as received, where formerly, they were allowed to accumulate for a number of months and then sent out of the office for binding. A modern punch card system has been installed. The data appearing on the certificates are recorded on the punch cards and the cards are then run through a sorting machine thus making possible current tabulation.

The second weakness was the lack of field work. Registration of births and deaths was carried out by approximately 900 local registrars distributed over the state. This local machinery was badly disorganized and vacancies at times existed in from 25 to 50 per cent of the registration districts. Arrangement has been made for systematic and continuous field work and closer supervision of this machinery. Already some twenty counties have been reached and provision is now made for reaching the remaining counties. Vacancies have been reduced to an average of about 10 and no vacancy is allowed to continue as long as was formerly the case. All this work has been done in cooperation with the U. S. Census Bureau which detailed special agents to Tennessee for approximately three months. The present vital statistics law has been in effect since 1910 but until recently, it has not been possible to register 90 per cent of the births required for admission to the Registration Area of the United States. During the early part of the year 1927, a check of registration was made by the U. S. Census Bureau and the state was admited to the Registration Area for Births. For a number of years, the state has been in the U. S. Registration Area for Deaths. The fact that Tennessee was admitted to the Registration Area for Births without a single prosecution bespeaks the hearty cooperation extended by all agencies including registrars, physicians, women's clubs and the educational authorities.

LABORATORIES

The Division of Laboratories was formerly a part-time division only, and its work was done in three separate laboratories located in the city of Nashville. The division is now on a full-time basis with a director, an assistant, a technician, an office clerk and a helper, all devoting their entire time to its requirements. Branch laboratories have been organized in Knoxville and Memphis, and, very largely through the assistance of agencies outside of the state, another branch laboratory has been established in Chattanooga. The laboratories of the State Health Department now compare favorably with those of other state health departments and service has been brought very much closer to the individual physician in the diagnosis of communicable diseases than has ever heretofore been the case. In addition to the usual examinations performed by public health laboratories, the laboratory now manufactures silver nitrate for the prevention of blindness of the newborn, and typhoid vaccine, both of which are supplied free of charge to physicians of the state. During the present biennial period, the number of specimens examined has increased from 18,501 to 48,148. Typhoid vaccine distributed has increased from 169,780 to 522,136 doses, and the number of physicians using the laboratory has increased from 628 to 1,311. Several lines of research have been undertaken by the laboratory principally for the purpose of simplifying technique. The increase in volume of service without material increase in personnel can be attributed very largely to the results of this research. The apparatus developed for use in the laboratory in like manner has effected a saving of several hundred dollars.

SANITARY ENGINEERING

Two additional sanitary engineers have been added to this division, making the total personnel, four engineers and one clerk-stenographer. With this increase in personnel it is possible to make each one responsible for a certain portion of the work. One engineer devotes his whole time to the control of water supplies; another to sewerage and stream sanitation; a third to general sanitation, including malaria, milk and allied subjects; and a fourth has been assigned to work in cooperation with the State Department of Eductaion and devotes the major part of his time to the improvement of the sanitary conditions of the schools of the state. The water supply of all towns of the state has been studied and the data assembled. Periodic visits are made to existing supplies and all are required to submit samples monthly to the laboratory. Thirteen towns have made structural improvements in plants; nine additional towns have installed sterilization equipment; eight towns have constructed new systems; and two towns have voted bonds for new systems. Rules have been promulgated requiring all plans for new construction or major improvements to existing structures to be submitted before construction is commenced. During the biennium, water supply plans for twenty-five towns have been submitted to the department and approved. In the state of Tennessee there are 184 towns of 400 or more inhabitants, the combined population of which is 826,353. Of these towns 135 now have public water supplies.

The supervision of municipal sewerage and sewage disposal was undertaken by the State Health Department in 1919. Since that time complete data have been collected on the disposal of sewage in the several towns of the state and studies are now under way having for their purpose the determination of methods of disposal and the extent to which the streams may be used for carrying sewage. At the present time, 67 towns have sewerage systems, 10 of which have been installed during the present biennium. Of the total population of the state living in towns (826,353), 604,300 now have sewers available. Preliminary surveys and other work incidental to the inauguration of a sewerage system have been conducted in ten additional towns.

Malaria control has been conducted in 21 towns of the state. Following the flood in western Tennessee an experiment was inaugurated to determine the feasibility of county-wide screening. The screening of rural homes has been found feasible and plans are now under way for the development of a county-wide screening program during the coming summer.

In 1926, the State Department of Public Health adopted the U. S. Public Health Service Standard Milk Ordinance as the standard for the state. Milk surveys were conducted in a number of towns, 5 of which have adopted the Standard Milk Ordinance. During the period the ordinance has been in effect, milk has shown improvement in some instances as high as 87 per cent. Under the provisions of this ordinance a specialist in milk sanitation is furnished by the department and he periodically visits the towns for the purpose of supervising the work.

CHILD HYGIENE AND PUBLIC HEALTH NURSING

Provision for this division formerly amounted to a flat sum of $10,000 per annum. There is now provided a director, a state supervising nurse, an assistant supervising nurse, and a stenographer. In addition, the division has at its disposal for the development of local health work an annual sum of $12,592.65 which is supplemented by an equal amount by the Federal government. The department has a two-fold function; that of rendering consultant service to local health organizations, and the developing of child health projects throughout the state. This important field of public health work has now been placed on a professional basis and the department is in position to render expert consultant service. Most of the child hygiene work is conducted through local health departments, however, since a large part of the state is without local health service it becomes necessary to participate directly with local groups for the purpose of disseminating information on child care. In order to unify practice, the State Health Department in cooperation with certain leading pediatricians and obstetricians of the state has prepared an outline of nursing procedure and practice.

HEALTH EDUCATION

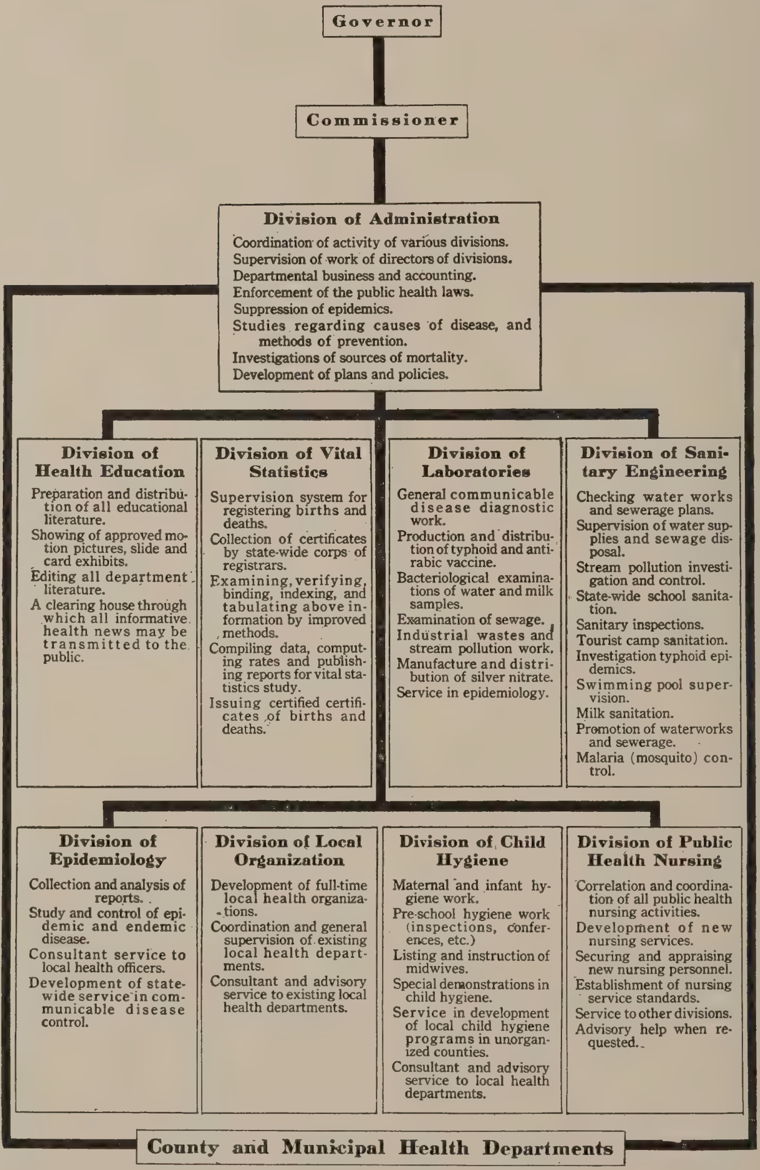
This most important phase of public health work is now receiving due attention by the department. A director has been secured and educational material covering all subjects pertaining to public health has been prepared. A major function of the division during the present biennium has been the promotion of registration of births and deaths. Plans are now under way for the coordination and further extension of health instruction in the educational institutions of the state.

TUBERCULOSIS

Through an act of the State Legislature in 1925, there was created the Tennessee Tuberculosis Hospital Commission, to which was given broad discretionary powers in dealing with tuberculosis control. The State Commissioner of Health has been elected chairman. A committee of the commission was designated and instructed to collect all possible information concerning the tuberculosis problem in Tennessee. This information is embodied in a report of the commission which will soon appear in printed form. The State Legislature in 1927 created the Division of Tuberculosis Control in the State Department of Health and made available the sum of $90,000. A program of field control has been projected and work will begin with the opening of the new fiscal period in July, 1927.

ADMINISTRATION

ORGANIZATION CHART
TENNESSEE STATE DEPARTMENT OF PUBLIC HEALTH



Governor

Commissioner

Division of Administration

- Coordination of activity of various divisions.
- Supervision of work of directors of divisions.
- Departmental business and accounting.
- Enforcement of the public health laws.
- Suppression of epidemics.
- Studies regarding causes of disease, and methods of prevention.
- Investigations of sources of mortality.
- Development of plans and policies.

Division of Health Education

- Preparation and distribution of all educational literature.
- Showing of approved motion pictures, slide and card exhibits.
- Editing all department literature.
- A clearing house through which all informative health news may be transmitted to the public.

Division of Vital Statistics

- Supervision system for registering births and deaths.
- Collection of certificates by state-wide corps of registrars.
- Examining, verifying, binding, indexing, and tabulating above information by improved methods.
- Compiling data, computing rates and publishing reports for vital statistics study.
- Issuing certified certificates of births and deaths.

Division of Laboratories

- General communicable disease diagnostic work.
- Production and distribution of typhoid and antirabic vaccine.
- Bacteriological examinations of water and milk samples.
- Examination of sewage.
- Industrial wastes and stream pollution work.
- Manufacture and distribution of silver nitrate.
- Service in epidemiology.

Division of Sanitary Engineering

- Checking water works and sewerage plans.
- Supervision of water supplies and sewage disposal.
- Stream pollution investigation and control.
- State-wide school sanitation.
- Sanitary inspections.
- Tourist camp sanitation.
- Investigation typhoid epidemics.
- Swimming pool supervision.
- Milk sanitation.
- Promotion of waterworks and sewerage.
- Malaria (mosquito) control.

Division of Epidemiology

- Collection and analysis of reports.
- Study and control of epidemic and endemic disease.
- Consultant service to local health officers.
- Development of state-wide service in communicable disease control.

Division of Local Organization

- Development of full-time local health organizations.
- Coordination and general supervision of existing local health departments.
- Consultant and advisory service to existing local health departments.

Division of Child Hygiene

- Maternal and infant hygiene work.
- Pre-school hygiene work (inspections, conferences, etc.)
- Listing and instruction of midwives.
- Special demonstrations in child hygiene.
- Service in development of local child hygiene programs in unorganized counties.
- Consultant and advisory service to local health departments.

Division of Public Health Nursing

- Correlation and coordination of all public health nursing activities.
- Development of new nursing services.
- Securing and appraising new nursing personnel.
- Establishment of nursing service standards.
- Service to other divisions.
- Advisory help when requested.

County and Municipal Health Departments

FINANCIAL REPORT—HEALTH DEPARTMENT*

July 1, 1925—June 30, 1927.

DIVISION	State Appropriation			Rockefeller Foundation									
	Personal Services	Operating Expenses	Sale	International Health Board	Refund	Federal	County	Balance Forwarded	American Social Hygiene Association	American Public Health Association	Totals	Expended	Balance
General Administration	$ 14,600	$ 21,400.00	$ 494.80								$ 36,494.80	$ 36,238.63	$ 256.17
Vital Statistics	17,300	7,760.00	429.10	$ 3,812.50	$ 523.09	$ 150.00					29,974.69	29,720.00	254.27
Sanitary Engineering	21,000	9,200.00		1,715.00							31,915.00	31,809.73	105.27
Laboratories	20,440	19,600.00		1,500.00	100.11			$ 279.16			41,919.27	41,908.66	10.61
Epidemiology and Local Organization	9,500	51,000.00		43,234.57			$ 101,659.24	10,993.08	$ 1,000.45		217,387.34	211,519.72	5,867.62
Health Education	8,400	2,200.00									10,600.00	10,405.54	194.46
Child Hygiene	12,450	29,985.10			1,636.24	47,787.98	38,999.84	11,232.84			140,092.00	137,498.63	4,593.37
Venereal Disease Control								2,772.49	1,159.17		3,931.66	3,415.86	515.80
Certified Copies						6,106.00					6,106.00	6,106.00 Reverted	
Special Birth Registration				1,000.00			185.30			$ 1,000.00	2,185.30	2,185.30	
Total	$ 103,690.00	$ 141,145.10	$ 923.90	$51,262.07	$ 2,259.44	$54,043.98	$140,844.38	$25,277.57	$ 2,159.62	$ 1,000.00	$ 522,606.06	$ 510,808.49	$11,797.57

*–Money contributed by the United States Public Health Service for the support of county health organizations and Trachoma Hospital not included, as same is not paid into the State Treasury.

PERSONNEL ON DUTY—JUNE 30, 1927.

DIVISION	Physicians	Engineers	Nurses	Chemists Bacteriologists	Stenographers Clerks	Others	Total
Administration	1				2		3
Vital Statistics	1				10		11
Sanitary Engineering		3			1		4
Laboratories				3	1	1	5
Epidemiology	1		1		1		3
Child Hygiene	2		2		2		6
Health Education	1				1	2	4
Local Organization	1				1	1	3
Total	7	3	3	3	19	4	39

NOTE—The personnel of local health organizations and branch laboratories are not included. Aid is given in the form of an allotment of funds.

DIVISION OF LOCAL ORGANIZATION

The Division of Local Organization was established for the purpose of correlating the work of existing local health departments with that of the State Department of Public Health, and for promoting the establishment of local health departments where none existed.

Rural communities to a great extent have lost whatever natural advantages they have had in matters of health, through their failure to institute modern methods for the prevention of disease and the promotion of health. As a result the death rates from many of the preventable diseases are higher in rural areas; in fact, diseases such as typhoid fever, diarrhea and enteritis, trachoma, and hookworm have come to be known as rural diseases. Physical defects are not being corrected early in life, and as a consequence disability later on is more prevalent.

The problem of rural health service in this state is complicated because of the wide variation in social and economic conditions. County rural populations range from 67,800 to 2,624; assessed valuations from $309,386,559 to $1,242,750; and per capita incomes from $836.00 per annum, to $110.00. With the exception of a few counties having county health service, no local agency exists, which is capable of instituting a modern program for the prevention of disease.

From the standpoint of administration the major health problem of the state exists in the rural communities and the smaller cities and villages. Experience has shown that a more efficient type of health service can be organized in the smaller communities by having such communities pool their resources with a larger unit of population, such as a county. The work of the Division of Local Organization has been devoted very largely to the establishment of more efficient local county health service.

HISTORICAL DEVELOPMENT

For a number of years each county has maintained a county physician whose principal function has been the care of the sick poor of the county and the quarantine of persons afflicted with communicable diseases. The salary paid and the facilities made available did not enable these men to carry on a complete and modern health program. In certain counties, however, self-sacrificing physicians appointed to these positions have done splendid work though limited in extent.

In 1914 a program was instituted in selecting communities for the prevention of typhoid fever, diarrhea and enteritis, and hookworm. Much was accomplished, but probably the principal effect was the demonstration of a need for a more complete type of health service rendered by trained public health workers serving on a whole-time basis. In 1919, the first county health department was established in Blount county.

TYPE OF ORGANIZATION

The type of organization instituted has varied to meet local circumstances. In counties where it has been possible to develop a larger organization, a county health department has been established, consisting of a health officer, at least one nurse, a sanitary officer and a clerk, all serving on a whole-time basis. In the smaller and less wealthy counties, either a nurse alone or a sanitary officer alone has been employed, depending upon the worker best suited to meet the local health need. For purposes of initiating the work and to assist local communities in carrying the financial burden, the State Department of Public Health in cooperation with the Federal Government, the Rockefeller Foundation and other agencies grants financial aid.

ADMINISTRATION

Method of organizing a county health department— The State Department of Public Health usually is apprised of a desire for such services from a combination of local sources, including school authorities, local health workers, organizations of lay men and women, chambers of commerce, farm bureau, or others. Before attempting any development other than interviewing the local representative persons and groups, the organizer from the State Department of Public Health arranges for a meeting with the local county medical society. After obtaining its approval of the plan, the organizer will appear before existing groups such as, parent-teacher associations, luncheon clubs and similar organizations, to explain the activities and accomplishments of a county health department. Where a community does not possess these or similar organizations, public meetings may be called. When it appears that public sentiment has been crystallized sufficiently, the several groups present their petitions to local appropriating bodies, as the county court; or where cities also participate, the city council. After the appropriation has been secured, the state organizer then assists the local authorities in securing qualified personnel. He later spends a few weeks with the newly appointed health officer, helping him to analyze his problems and develop his program.

Personnel and Appointment—The personnel of the unit is selected from a list of applicants possessing qualifications approved by the State Department of Public Health.

Training of Personnel—Arrangements have been perfected with the Rockefeller Foundation whereby prospective health officers are accepted without cost to the state at one of their training stations maintained for this purpose. Following this period of training, the prospective health officer is required to visit several of the counties in Tennessee, maintaining health departments. The University of Tennessee has instituted a special course of three months duration, for the purpose of training sanitary inspectors.

To supplement this training the technical personnel of the State Department of Public Health such as the Epidemiologist, the Supervising Nurse, the Director of Child Hygiene and others, periodically visit these counties for the purpose of systematizing this work and aiding in the development of the program.

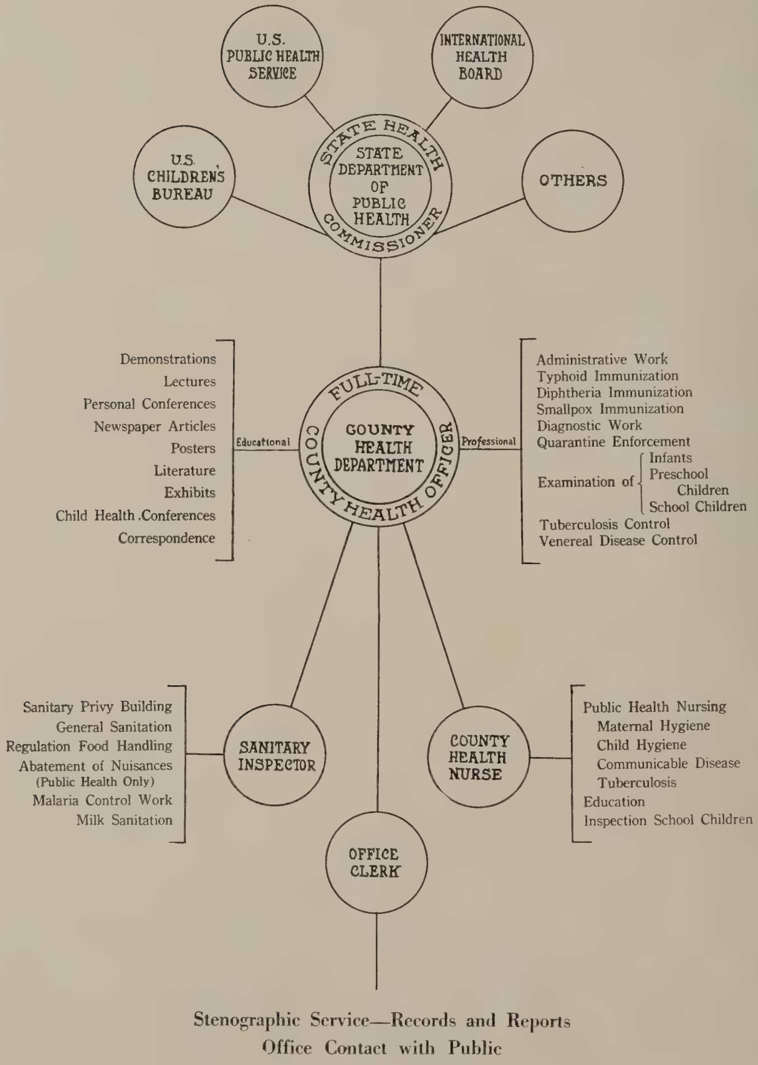
Finances—The State Department of Public Health in co-operation with the Federal Government and the Rockefeller Foundation and other agencies renders financial assistance to these county health organizations. The exact amount varies, but the following sample budget is quite typical.

SAMPLE BUDGET FOR A FULL-TIME COUNTY HEALTH DEPARTMENT WITH A PERSONNEL OF FOUR—$9,500 PER ANNUM

Item	*State and Other Agencies*	*County and Local Sources*	*Total*
Salaries:			
Health Officer	$1,500	$1,500	$3,000
Nurse	750	750	1,500
Inspector	750	750	1,500
Clerk	360	360	720
Travel:			
Health Officer	390	390	780
Nurse	330	330	660
Inspector	330	330	660
Contingent Fund	340	340	780
Total	$4,750	$4,750	$9.500

NOTE: It is expected that the county will assume a larger share of the financial burden as time goes on and will make provisions for increase of personnel.

COUNTY HEALTH DEPARTMENT ORGANIZATION



GROWTH OF COUNTY HEALTH ORGANIZATIONS

(Health Departments and Sanitary Officers)

1919	1920	1921	1922	1923	1924	1925	1926	1927*
Blount	Blount	Blount	Blount	Blount	Blount	Blount	Blount	Blount
	Davidson	Davidson	Davidson	Davidson	Davidson	Davidson	Davidson	Davidson
	Roane	Roane	Roane	Roane	Roane	Roane	Roane	Roane
	Montgomery	Montgomery	Montgomery	Montgomery	Montgomery	Montgomery	Montgomery	Montgomery
		Williamson	Williamson	Williamson	Williamson	Williamson	Williamson	Williamson
			Gibson	Gibson	Gibson	Gibson	Gibson	Gibson
				Obion	Obion	Obion	Obion	Obion
				Sevier	Sevier	Sevier	Sevier	Sevier
					Rutherford	Rutherford	Rutherford	Rutherford
						Weakley	Weakley	Weakley
						†Rhea	†Rhea	†Rhea
						†Morgan	†Morgan**	
							Lauderdale	Lauderdale
							Shelby	Shelby
							Hamilton	Hamilton
							Dyer	Dyer
								†Anderson
Population 28,388	136,210	159,215	207,652	259,240	294,581	344,456	525,396	529,755
Percentage of total rural population of State. 1.49	7.18	8.37	10.86	13.55	15.33	17.96	27.35	27.53

NOTE—Appropriations have been secured in the counties of Lake and Bradley for work to begin July 1, 1927.
*-County health organizations in operation on June 30, 1927.
**-Discontinued December 1926.
†-County Sanitary Officers working alone.

Relation—These departments are instituted, primarily, for the purpose of meeting local health needs. The effectiveness of the program of the state for the promotion of public health will depend upon the efficiency of the local health organizations. The State Department of Public Health, through its several divisions, renders supervisory and consultant service. Frequently the solution of a local health problem will call for expert assistance such as that rendered by a sanitary engineer, trained epidemiologist or an expert in child hygiene. Laboratory service is rendered by the State Health Department when it is beyond the resources of the local department.

County Sanitary Officer—Such an organization is instituted in counties not financially able to bear the burden of a complete health organization. The method of organization and the plan of administration is essentially the same as that for a county health department.

SAMPLE BUDGET FOR COUNTY SANITARY OFFICER

Item	*State and Other Agencies*	*County and Local Sources*	*Total*
Salary:			
Sanitary Officer	$ 750	$ 750	$1,500
Travel:			
Sanitary Officer	390	390	780
Contingent Fund	160	320	$1,300
Total	$1,300	160	$2,600

PROGRAM OF COUNTY HEALTH DEPARTMENT—(Health Officer, Inspector and Nurse)

Health Instruction—Pertinent facts concerning public health are disseminated by means of suitable literature, news articles, public addresses, class instruction and by visual methods.

Communicable Disease Control—Reports are secured from physicians, quarantine and isolation instituted, epidemiological factors are investigated to determine sources of infection and mode of spread, and immunization measures are promoted.

Venereal Disease Control—Is instituted by means of education in sex hygiene, by control of infected persons known to be spreading the disease and by making provision for adequate treatment of infected individuals.

Tuberculosis Control—The control of this disease is largely a matter of education as to the proper mode of living. Infected individuals are located at diagnostic clinics, during school examinations and through reports from physicians. Visits to the homes of patients are made by nurses of the department who work under the supervision of the family physician or clinic.

Control of Special Diseases—

Malaria: This disease which is prevalent in certain sections of the state is transmitted by the mosquito. Its control involves the control of mosquito breeding and institution of measures such as screening.

Hookworm: This disease, once a great scourge in the state but now confined to certain areas, is spread by means of bowel discharges. Its control consists of the institution of proper methods of disposal of human excreta, as by the sanitary privy. Treatment of existing cases is an important part of the program.

Trachoma: This most distressing and painful disease of the eye is both curable and preventable. The program consists of education, field clinics and hospitalization of severe cases.

Certain other diseases such as goiter, tularemia (rabbit fever) and the like are dealt with by the local health department.

Sanitation—Man's environment frequently determines the diseases with which he will be afflicted. The program of sanitation consists of:

Improvement of water supplies.
Installation of proper methods of sewage disposal.
Screening the homes.
Improvement of schools along the lines mentioned above, together with correction of lighting, seating arrangements, ventilation and the like.
Improvement of food supplies.

Inspection of restaurants and other food producing or dispensing establishments.

Inspection of meat.

Examination of food handlers.

Maternal Hygiene— By imparting to mothers the essential facts concerning proper care preceding and following birth of the child, and impressing upon her the necessity of proper medical attention, this part of the program is accomplished.

Child Hygiene—The program covers the period of infancy, preschool age, and during the time the child is in school. The work is very largely educational but this is supplemented by periodic examination, the correction of physical defects and stimulation of interest on the part of the parents in the health of the child.

Assembled for Diphtheria Immunization.

Other Activities—In this grouping there is a wider range of services, the demand for which varies in different communities. These services are:

Promotion of registration of births and deaths.

Physical examination of applicants for state and county institutions, examination of children for work, etc.
Periodic health examinations of adults.
Program for prevention of accidents.
Corrections of conditions in industry prejudicial to health.
Promotion of mental hygiene.
Rehabilitation of handicapped.

Record Keeping—Careful records of all activities are kept and the data analyzed, in order that the problem may be approached more intelligently. Reports are made periodically to the contributing agencies and a summary is prepared for general distribution.

PROGRAM FOR COUNTY SANITARY OFFICERS—(Inspector Working Alone)

In counties having a sanitary officer alone, the work is devoted almost exclusively to activities appearing above, under the heading of "Sanitation." A summary report of county sanitary officer work will be found in table "Summary Report of Major Activities." (Anderson and Rhea counties.)

PROGRAM OF COUNTY NURSES—(Nurse Working Alone)

This work is conducted under the supervision of the Division of Child Hygiene and Public Health Nursing. A complete account will be found in the report of that division.

PROGRESS IN SANITATION

(Privies, septic tanks, sewer conections installed)

Period	*Number*
1924-25	1,915
1925-26	2,826
1926-27	9,614

RESULTS OF SCHOOL HYGIENE

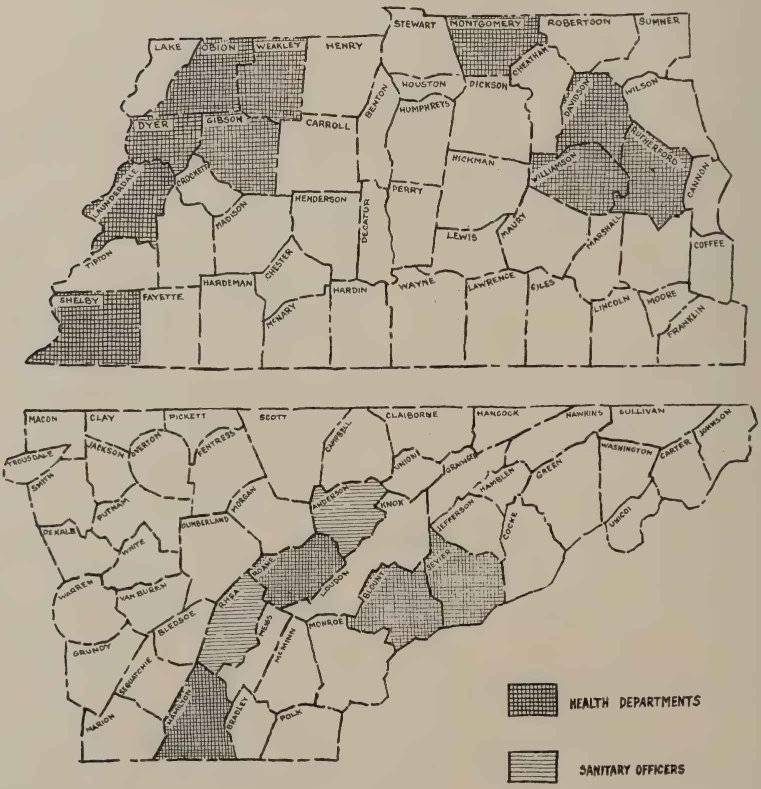
Period	*Children Examined*	*Physical Defects Corrected*
1924-25	18,168	3,425
1925-26	26,686	3,352
1926-27	48,963	5,248

PROGRESS IN IMMUNIZATION

Period	*Diphtheria Toxin-antitoxin*	*Smallpox*	*Typhoid*
1924-25	7,012	3,376	14,844
1925-26	5,917	10,086	37,823
1926-27	20,940	16,332	37,850

County Health Organizations

JUNE 30TH 1927



PERSONNEL AND BUDGET
Cooperative County Health Work
June 30, 1927

COUNTY	Population	Health Officers	Nurses	Sanitary Officers	Others	Annual Budget	Per Capita Expend.
Anderson	18,746	----	----	1	----	$ 2,600.00	.14
Blount	34,971	1	1	1	1	12,360.00	.36
†Davidson*	43,100	1	7	4	2	20,000 00	.46
Dyer	31,729	1	1	1	1	9,400.00	.30
Gibson	44,746	1	2	1	1	13,000.00	.30
Hamilton*	58,100	1	2	2	1	16,400.00	.27
Lauderdale	21,794	1	1	1	1	9,020.00	.43
Montgomery	32,265	1	2	1	1	13,000.00	.38
Obion	28,393	1	1	1	1	9,500.00	.38
Rhea	13,812	----	----	1	----	2,600.00	.19
Roane	25,986	1	2	1	----	9,900.00	.37
Rutherford	33,059	1	5	2	1	16,300.00	.50
Sevier	22,452	1	3	----	1	7,400.00	.33
Shelby*	67,800	1	3	5	4	25,600.00	.41
Weakley	31,053	1	1	1	1	9,150.00	.29
Williamson	23,409	1	1	1	1	10,400.00	.45
Total	531,415	14	32	24	17	$ 186,630.00	.35

*–Population: Davidson exclusive of Nashville; Hamilton exclusive of Chattanooga; Shelby exclusive of Memphis.
†–Financial aid from state not given prior to June 30, 1927.

SUMMARY REPORT OF MAJOR ACTIVITIES.

Full-time County Health Organizations.

	COUNTIES															
	Anderson*	Blount	Davidson	Dyer	Gibson	Hamilton	Lauderdale	Montgomery	Obion	Rhea*	Roane	Rutherford	Sevier	Shelby	Weakley	Williamson
Period of Operation Services	6 mos.	2 yrs.	2 yrs.	18 mos.	2 yrs.	18 mos.	1 yr.	2 yrs.	2 yrs.	23 mos.	2 yrs.	2 yrs.	2 yrs.	9 mos.	18 mos.	2 yrs.
I. Education:																
(a) Literature distributed	4,689	9,255	19,481	7,205	2,882	4,938	2,432	11,380	9,336	5,719	8,388	14,252	2,155	3,150	4,513	1,852
(b) Attendance at lectures	924	5,316	------	5,142	12,298	35,800	5,334	28,844	23,997	396	26,978	9,555	15,040	2,470	22,050	11,236
II. Laboratory:																
Specimen	49	666	3,509	305	737	865	133	960	569	62	234	6,872	514	849	263	850
III. Communicable Diseases:																
(a) Cases supervised	------	5	4,781	752	574	510	60	2,054	607	--------	255	426	100	420	260	259
(b) Field Visits	------	4,032	807	965	1,802	687	47	1,286	2,163	--------	257	1,256	477	118	245	898
IV. Immunization:																
(a) Diphtheria	------	1,056	8,221	107	699	5,123	--------	1,885	1,159	--------	1,322	2,907	2,530	3,542	1,550	942
(b) Smallpox	------	630	2,333	375	3,280	2,938	15	1,458	2,129	--------	503	2,018	320	7,402	771	1,230
(c) Typhoid Fever	------	6,708	9,677	4,514	6,452	2,214	2,347	6,797	7,084	--------	8,018	4,316	7,981	5,519	8,520	4,261
V. Tuberculosis:																
(a) Cases supervised	------	13	181	28	8	200	1	18	16	--------	6	62	10	13	8	11
(b) Number examined	------	88	1,163	51	58	870	2	54	16	--------	14	71	16	6	15	33
(c) Home visits	------	36	7,884	14	187	1,164	--------	182	75	--------	103	1,913	49	15	39	60
VI. Venereal Disease:																
(a) Cases supervised	------	38	48	65	60	110	4	57	35	--------	4	34	3	--------	2	28
(b) Number treated	------	101	24	447	415	440	4	63	76	--------	2	145	13	--------	8	61
VII. Sanitation:																
(a) Safe excreta disposal	417	741	1,808	215	991	873	86	245	1,229	1,786	424	99	56	3,784	140	414

(b) Safe water supplies	50	42	161	479	281	190	132	198	487	59	166	15	49	175	26	126
(c) Nuisances corrected	8	71	1,316	2,129	382	502	24	264	858	46	1,913	1,058	15	308	17	151
(d) Houses screened	266	31	------	7	--------	304	--------	5	95	41	138	118	20	--------	--------	10
(e) Dairy Inspections	4	43	1,707	206	76	177	5	246	91	--------	86	230	--------	1,311	62	87
(f) Cows T B tested	------	78	7,446	323	378	585	14	102	357	3	447	239	2	5,095	234	209
(g) Inspections Food Estab-	40	100	658	310	522	356	--------	280	828	250	933	27	21	--------	1,089	241
VIII. Maternal Hygiene:																
(a) Prenatal cases supervised	------	40	240	28	56	37	9	101	55	--------	93	384	144	4	34	78
(b) Prenatal home visits	------	77	395	50	168	83	20	287	112	--------	200	1,440	240	19	67	215
(c) Postpartum home visits	------	38	764	22	94	43	4	161	252	--------	165	1,194	85	2	12	234
(d) Midwives under supervision	------	5	2	8	--------	14	44	--------	58	--------	--------	27	5	--------	--------	22
IX. Infant Hygiene:																
(a) No. under supervision	------	163	266	106	53	88	8	164	68	--------	44	937	50	8	104	156
(b) Defects found	------	33	11	80	193	35	46	96	166	--------	112	97	44	--------	124	33
(c) Defects corrected	------	6	6	3	--------	--------	--------	66	3	--------	29	20	19	--------	--------	4
(d) Home visits	------	332	1,085	130	662	340	46	1,500	659	--------	910	3,506	375	8	201	532
X. Preschool and school Hygiene:																
(a) Number examined	------	6,919	4,499	3,226	1,696	8,546	1,490	2,780	7,656	--------	8,406	4,636	1,519	5,562	3,832	4,362
(b) Defects found	------	8,755	7,478	2,995	5,925	6,406	5,138	3,119	7,238	--------	8,215	4,031	1,140	5,034	4,610	3,265
(c) Defects corrected	------	803	110	70	1,538	147	146	622	1,190	--------	1,776	961	88	7	--------	693
XI. Adult examinations:																
(a) Life extension	------	32	65	--------	59	258	2	--------	160	--------	214	68	80	4	2	47
(b) Food handlers	------	------	------	--------	--------	67	--------	--------	170	--------	5	71	--------	--------	--------	--------

*County Sanitary Officers working alone.

SPECIAL FEATURES REPORTED BY INDIVIDUAL COUNTIES

A number of children were found with diseased tonsils and adenoids. Among these were many who could not afford to pay for corrective work. In cooperation with the local county medical society and civic clubs a free clinic was held at which twenty-two operations were performed. This clinic proved very successful and it is proposed that similar clinics be held in the future.

Each School Child is Given an Examination

As a means of inducing correction of physical defects and promoting better health habits, a blue ribbon contest was conducted. In order to qualify for the blue ribbon, each child was required to meet the following standard:

Satisfactory work in school.

Smallpox Vaccination Clinic.

Infants Are Examined and Mothers Are Taught Correct Methods of Child Care.

Reasonable cooperation in the practice of health habits.

Satisfactory behavior and attitude in the school environment.

Immunization against typhoid fever, diphtheria and smallpox,

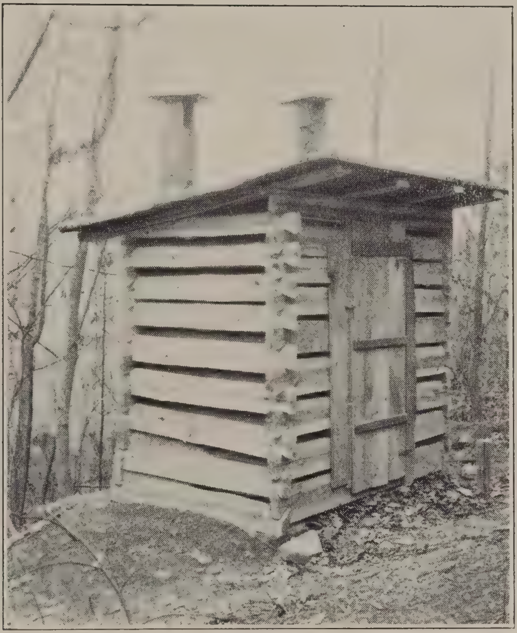
In the school winning first place there were twenty-nine blue ribbon children or 36.7 per cent of children in attendance.

The effect of infant welfare work is clearly demonstrated. Seven hundred and twenty-six babies were born during the year 1926; four hundred and seventy-six were registered at the health department for clinic and follow-up nursing service. Of this number only fifteen died, or one out of thirty-two. The remaining two hundred and fifty did not receive this service and of this number thirty-five, or one out of every seven.

Centralized Construction—Concrete Floor and Riser for Sanitary Privy is Cast in One Piece

Care of crippled children has been an important activity of every health department. The work in one county, however, has been outstanding. Twenty-three crippled children were located and arrangements were made for hospital care and follow-up treatment of each case.

During the first nine months of the operation of a health department slightly in excess of ten thousand rural sanitary privies were built. These were of the pit type, covered by a combined concrete slab and seat riser. These were manufactured at a central point by the health department and placed at a cost of $6.50 each.



Old Privy Rendered Sanitary by Fly-proofing Pit and Seat.

ACKNOWLEDGEMENTS

During the biennial period financial aid for the support of local health work was received from the U. S. Public Health Service, the U. S. Children's Bureau, and the Rockefeller Foundation. In addition to this allotment of funds towards the support of local projects, the U. S. Public Health Service made available the services of Dr. W. K. Sharp, Jr., who acted as director of the division, and Mr. E. C. Stoy, who supervised the work in the counties having sanitary officers and acted as a consultant on sanitation to the county health departments. The Rockefeller Foundation assisted in the training of personnel assigned to their training stations, and granted the travel and living stipend.

The Commonwealth Fund assisted financially and rendered special consultant service to the Child Health Demonstration project in Rutherford county. The report of services rendered are set forth in the consolidated report of county health organziations. In addition to performing the usual services of a county health department the Demonstration is conducting extensive studies in child health problems and methods for their solution.

DIVISION OF EPIDEMIOLOGY

It has often been said that an effective program for the control of disease can not be formulated without knowledge as to when, where, and in whom, cases of disease are occurring.

Prior to the beginning of the period under consideration there had been no division of epidemiology in the State Department of Public Health. No systematic studies of disease prevalence were made, and practically the only service rendered was the investigation of outbreaks of disease when requested by local health authorities. Such assistance was rendered by members of other divisions when they could be spared from their regular duties. No efficient method had been developed for collecting information concerning the number of cases, where they were, or what persons were affected. Monthly reports were being received very irregularly from about one-half the counties, while from some counties no reports whatsoever were obtained. These monthly reports could not be considered of much value either from an administrative or a statistical point of view because of delay and incompleteness. A case of smallpox might develop, many people be exposed and many other cases of the disease develop before its existence would become known, consequently investigation as to the source of the infection could not be started until long after the time for efficient action had passed.

The Division of Epidemiology was established in July, 1926, and placed under the direction of a whole-time physician skilled in modern communicable disease control practice. The Bureau of Venereal Disease Control was merged with the Division of Epidemiology, thus making possible greater efficiency and economy under unified direction. The functions of the division are as follows: Collection of information concerning prevalence of disease; study of factors involved in occurrence and spread; and, institution of measures for prevention and control.

LINES OF DEVELOPMENT

The development of the divisional activities has been along the following lines: (1) Improvement of morbidity (case) reporting. (2) Study of the prevalence of communicable diseases over the state and adoption of programs for their control. (3) Advisory service to local city and county health officers. (4) Investigation and control of major epidemics and of incipient epidemics of the more serious controllable diseases.

MORBIDITY REPORTING

As this activity is the basic or fundamental one upon which the development of the remainder of the program rests, it was thought that the system of disease reporting should be made efficient. With the cooperation of the U. S. Public Health Service a new system was instituted. This system had proved very successful in other states, notably Alabama, and it was believed that the method to be used would be adapted to conditions existing in Tennessee. The success of this system depends largely upon the cooperation of practicing physicians and local health officers. This cooperation has been readily given in nearly all instances, and the completeness of reporting has been increasing gradually.

It was necessary to revise and bring up to date the total list of about 3,000 physicians practicing in Tennessee. Briefly, the new system of morbidity reporting, is as follows:

1. Two large groups of physicians are considered: first, those practicing in cities or counties with a full-time local health department; second, physicians practicing in counties having no full-time local health department.

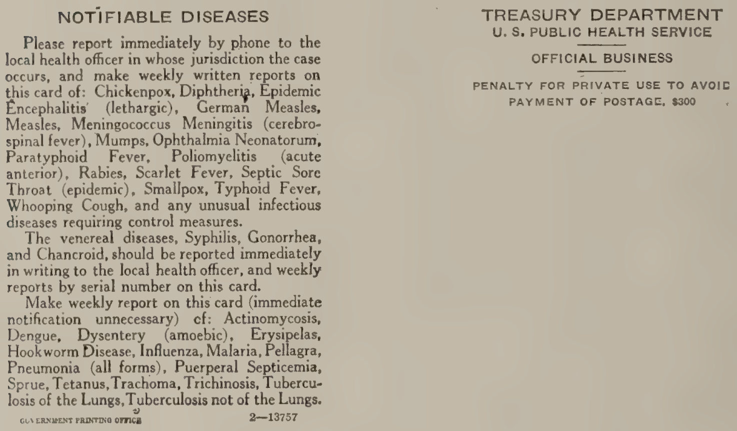
2. For purposes of administration these groups have been divided into sub-groups: (1) large organized cities; (2) small organized cities; (3) organized counties; (4) counties in which the county health officer acts as Assistant Collaborating Epidemiologist; (5) cities and towns in which the health officer acts as Assistant Collaborating Epidemiologist; and (6) counties in which the county or city health officer signified a desire to be relieved of this work.

3. The physicians of the state, with the exception of those in the cities of Memphis and Nashville, receive each week a double post card, one-half of which is to be detached and mailed. On the return half of the card the physician is to list the new cases of disease seen during the previous week, giving the name of the disease, name of patient or case number, the address of the patient and the race, sex and age. The card is already addressed to its destination and no postage is required, as the franking privilege has been accorded.

4. In the first five sub-groups mentioned, the cards are addressed to return to the local Assistant Collaborating Epidemiologist who makes such records as he desires for carrying on his

work and he then mails the cards to the Collaborating Epidemiologist, State Department of Public Health, Nashville. The large cities send weekly summary reports, but the cards from all the other sub-groups are finally received at the office of the State Health Department where they are tabulated and filed. A weekly morbidity report is sent by telegraph to the Surgeon General of the U. S. Public Health Service, Washington, D. C.

Morbidity Report Card (Address Side).



NOTIFIABLE DISEASES

Please report immediately by phone to the local health officer in whose jurisdiction the case occurs, and make weekly written reports on this card of: Chickenpox, Diphtheria, Epidemic Encephalitis (lethargic), German Measles, Measles, Meningococcus Meningitis (cerebrospinal fever), Mumps, Ophthalmia Neonatorum, Paratyphoid Fever, Poliomyelitis (acute anterior), Rabies, Scarlet Fever, Septic Sore Throat (epidemic), Smallpox, Typhoid Fever, Whooping Cough, and any unusual infectious diseases requiring control measures.

The venereal diseases, Syphilis, Gonorrhea, and Chancroid, should be reported immediately in writing to the local health officer, and weekly reports by serial number on this card.

Make weekly report on this card (immediate notification unnecessary) of: Actinomycosis, Dengue, Dysentery (amoebic), Erysipelas, Hookworm Disease, Influenza, Malaria, Pellagra, Pneumonia (all forms), Puerperal Septicemia, Sprue, Tetanus, Trachoma, Trichinosis, Tuberculosis of the Lungs, Tuberculosis not of the Lungs.

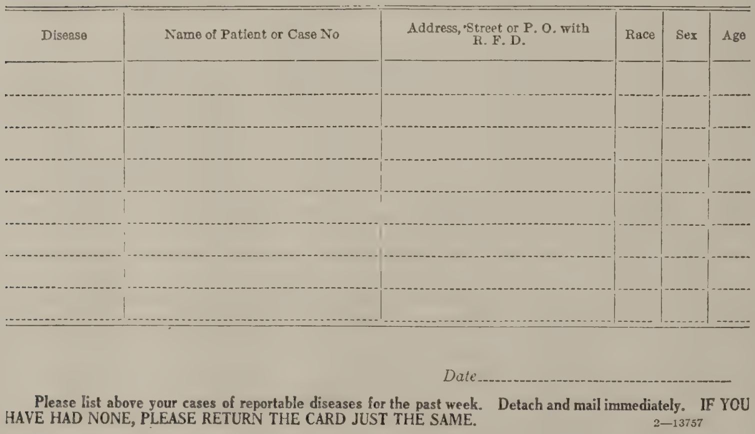
GOVERNMENT PRINTING OFFICE 2—13757

TREASURY DEPARTMENT
U. S. PUBLIC HEALTH SERVICE

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300

Morbidity Report Card (Data Side).



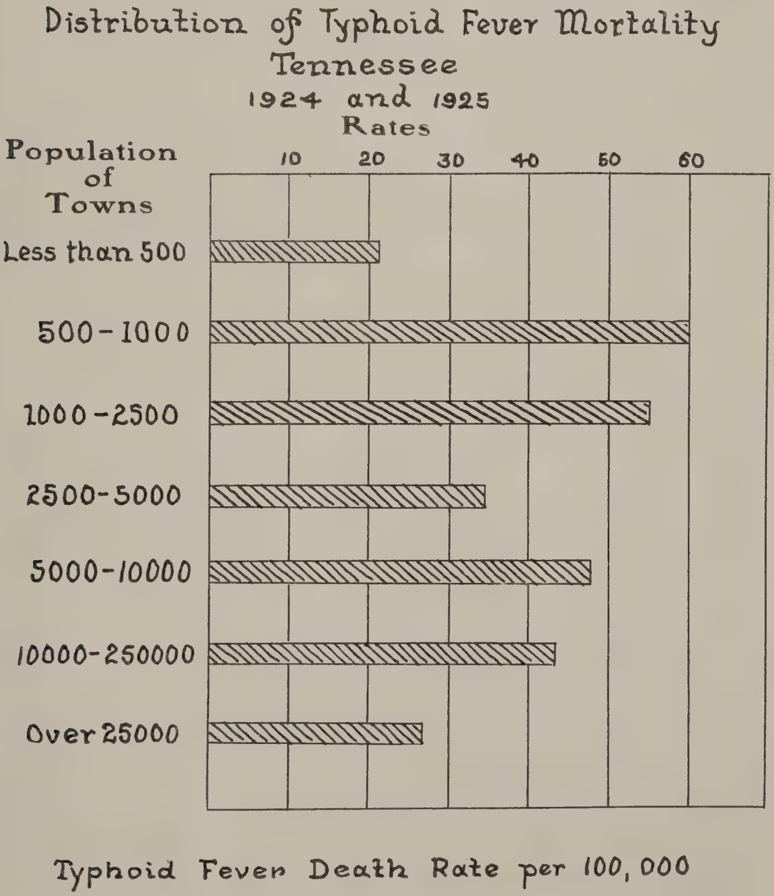
Disease	Name of Patient or Case No	Address, Street or P. O. with R. F. D.	Race	Sex	Age

*Date*____

Please list above your cases of reportable diseases for the past week. Detach and mail immediately. IF YOU HAVE HAD NONE, PLEASE RETURN THE CARD JUST THE SAME. 2—13757

5. The cards are filed by counties and by physicians. This method of reporting has been proving quite satisfactory because of the fact that information is available at much shorter intervals than before, the information is more complete and reporting is more regular and complete. The method is very satisfactory for the physician, since he reports at weekly intervals and consequently can recall his cases, only the essential information is required, the form is easy to complete, and no postage is required. The system is by far the most efficient and satisfactory of any yet devised for this state.

PRINCIPAL COMMUNICABLE DISEASE PROBLEMS


Distribution of Typhoid Fever Mortality
Tennessee
1924 and 1925

The principal communicable disease problems of Tennessee are typhoid fever, tuberculosis, smallpox, diphtheria, and the venereal diseases. Hookworm disease is a major problem in certain parts of the state as malaria is in the western part of the state.

Typhoid Fever—A study was completed comparable to a recent study in Alabama, which divides the typhoid fever cases and deaths by rural areas and towns and cities of various sizes. The analysis of deaths from typhoid fever for the years 1924 and 1925, shows a consistently higher rate in all seven of the groupings used. The highest rate is found in towns of from 500 to 1,000 population. The lowest rate is found in rural areas and in towns of less than 500 population. Corrections were made for the place of residence, so that cities were not charged with deaths of cases originating outside the cities.

Typhoid fever is largely a problem of community and domestic sanitation. Immunization against the disease is valuable as a temporary measure and is urged very strongly in areas where typhoid fever exists. Its eradication, however, is dependent upon a further extension of the sanitation program now in progress.

Tuberculosis—Some assistance was given the committee of the commission appointed by the Governor for the study of the problem in the state. The last General Assembly of the state provided for the establishment of a Division of Tuberculosis Control, and this division when established will make further detailed studies of the problem of tuberculosis in Tennessee. Consultant service will be given from the Division of Epidemiology.

Smallpox—The reported cases of smallpox have been lower in the last year than for any year for which there are accurate records. Assistance was rendered local health authorities in outbreaks of the disease in two counties by personal visitation and assisting in vaccination clinics. The newer method of vaccination by the "multiple pressure" method has been demonstrated to doctors and other groups in various sections of the state.

The mortality from smallpox has been low, running approximately 0.2 per 100,000 population, as shown on the accompanying chart.

It was felt as a result of the survey that the present state regulations, giving local health authorities the power to pass any

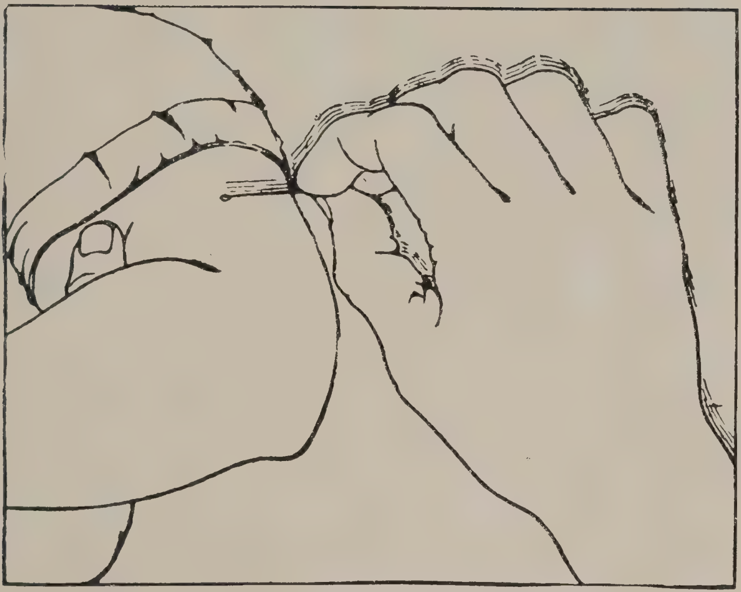


FIG. 1—The "multiple pressure" method of vaccination, showing the rapid up-and-down motion of the side of the needle, held by the hand at the right, against the drop of vaccine on the arm at the left. (After Leake in Public Health Reports.)

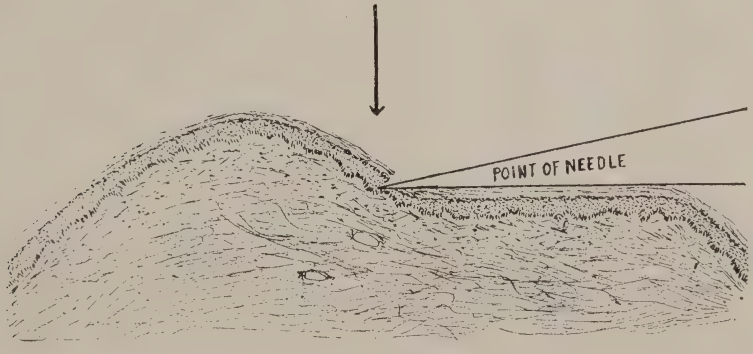
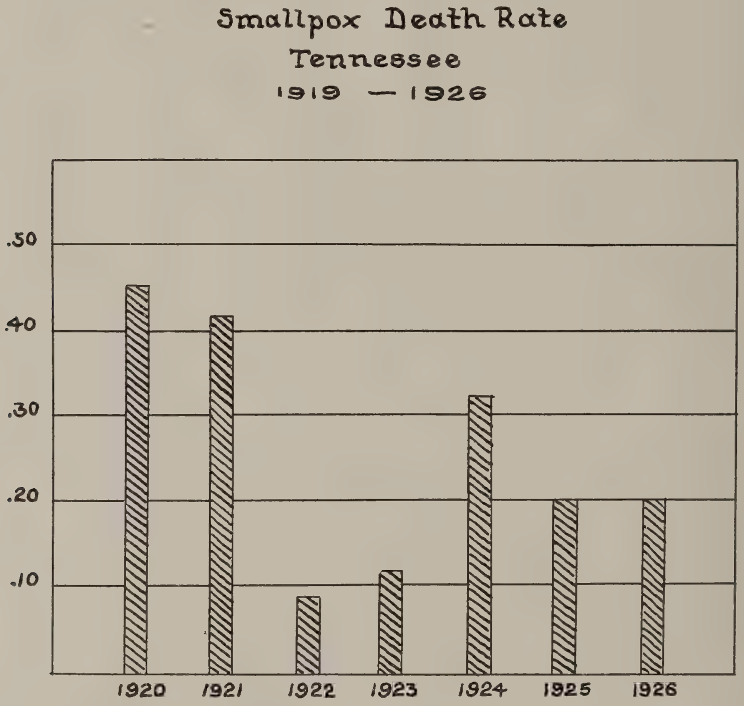


FIG. 2—Diagrammatic sketch of pressure method of vaccination. The upper illustration shows the relation of the skin layers before the pressure of the needle has been applied. The lower shows the motion of the needle from its first position above and parallel to the skin, as indicated by the dotted outline, to its final position pressing against the surface of the skin and entering it slightly. (Magnification, 25 diameters. To save space, the curvature of the surface of the arm is much exaggerated and the perpendicular distance which the needle moves is diminished in proportion to this magnification.) (After Leake in Public Health Reports.)

local vaccination regulations which might be deemed necessary without any central interference, was placing the responsibility where it belonged and that any possibility of state-wide compulsory vaccination was out of the question for the present. Vaccination however, is being promoted especially through local health organizations. The department is endeavoring to improve vaccination technique.



Death Rate per 100,000 Population

Diphtheria—Diphtheria is usually less prevalent and less fatal in southern than in northern states, yet it is a problem. Immunization work is being carried out in conjunction with local health organizations and practicing physicians. Articles on the cause and prevention of the disease were prepared and these appeared in "Health Briefs." The doctors outside the four large cities were circularized and some of the later developments in diphtheria control were brought to their attention. A large amount of diphtheria literature was distributed to interested persons and organizations.

Approximately two hundred persons at the Tennessee School for the Blind were Schick tested and all those showing positive reactions were given toxin-antitoxin. The age group 5-9 showed 54% Schick positive; 10-14, 34% positive; and 15-19, 32% positive. Of these 41% of the white males were positive, and approximately the same percentage of white females. Colored males showed 17% positive and colored females 46% positive.

About 1,000 children were Schick tested in counties of Overton, White and Van Buren and most of the positive reactors were given toxin-antitoxin by the local physicians. Two industrial concerns furnished the toxin-antitoxin for use in the families of their employes, and it was administered by the company physician. Toxin-antitoxin campaigns carried on in other parts of the state were highly successful but no accurate records could be obtained from local physicians who performed most of the work.

The Venereal Diseases— The activities of the division may be classed under two main headings: (1) General health education and (2) Improvement of diagnostic and treatment service. Assistance in the educative phase was supplemented by the U. S. Public Health Service by assigning Miss Anne Simpson, Regional Consultant, and Dr. Ralph B. Stewart, Lecturer, for a period of time to this state. By lectures, pamphlets, motion pictures, slides and exhibits, a great deal of information was presented. The educational work has been carried on largely in the upper school grades, colleges, normal schools and in connection with various women's organizations. Field agents of the Y.M.C.A. and the American Purity League have cooperated and have been supplied with motion pictures and literature by this division.

A beginning has been made in organizing and improving the venereal disease clinic service for indigents in the organized counties with full-time health officers. Free arsenicals are furnished for indigent persons where the physician promises to give his services without charge. The distribution of drugs for this purpose is limited to individual physicians, small hospitals and county health department clinics because of limited funds and demands of the rural sections. There were distributed during the first year of the biennium 1,451 ampules of arsenical preparations, and 2,514 ampules during the second year of the biennium, making a total of 3,965 ampules of arsenical preparations.

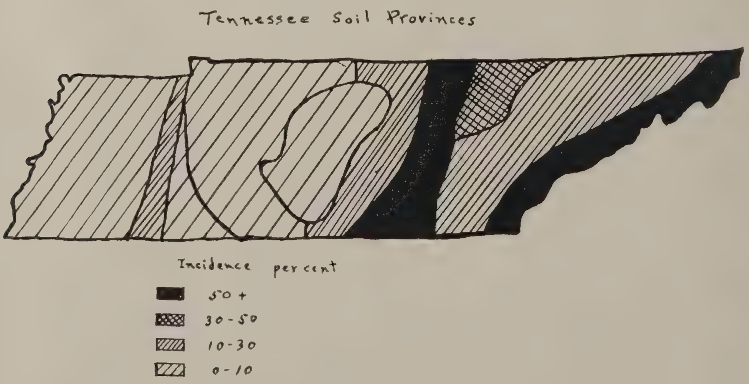
An attempt is being made to improve reporting and the result of these efforts can be seen by the following:

CASES REPORTED

	Syphilis	Gonorrhea	Total
First 3 months of 1926	6,432	2,320	8,752
Last 3 months of 1926	7,136	2,789	9,925

Questionnaires sent out to all hospitals in the state gave some interesting information. Some of the important points are: Of 32 general hospitals, 16 admit venereal diseased patients; of the 30 special hospitals, 11 admit venereal diseased patients; of the 43 hospitals rendering obstetrical service, 17 require Wassermann tests on all patients, three on selected cases and three on all charity obstetrical cases. Of the 62 hospitals considered, a Wassermann test is performed on all admissions in 11 institutions and on all charity admissions in four institutions.

Hookworm—It can be said that this is one problem which has been defined in Tennessee. The International Health Board of the Rockefeller Foundation began a hookworm intensity survey late in 1925 and this survey was completed in 1926. Dr. E. R. Rickard and Dr. J. Austin Kerr were detailed to Tennessee for this work. A study of soil formations and the development



Hookworm Incidence - 1925

INTENSITY OF HOOKWORM INFESTATION IN TENNESSEE BY SOIL PROVINCES

1 Negative	
2 Very Light:	1– 25 Worms
3 Light:	26–100 Worms
4 Moderate:	101–500 Worms
5 Heavy:	501–1000 Worms
6 Very Heavy:	1001–3000 Worms

SOIL PROVINCES	Percentage in each Intensity Group						Positive specimens Insufficient for Count
	1	2	3	4	5	6	
3 Cumberland Plateau	23.4	25.5	27.9	20.0	2.0	1.0	0.0
1 Unaka Mountain Range	31.3	31.8	21.5	11.6	0.9	0.01	2.5
4 N. E. Cumberland Plateau	66.6	17.4	11.1	4.7	0.0	0.0	0.0
9 Upper Coastal Plain	83.6	12.6	3.4	0.0	0.0	0.0	0.0
5 East Highland Rim	86.0	10.2	2.5	0.0	0.0	0.0	0.8
2 Valley East Tennessee	86.2	9.1	2.9	0.0	0.0	0.0	1.1
8 Appalachian Border	94.2	5.7	0.0	0.0	0.0	0.0	0.0
7 West Highland Rim	98.2	0.0	0.0	0.0	0.0	0.0	1.8
6 Central Basin	100.0	0.0	0.0	0.0	0.0	0.0	0.0
10 Plateau East Tennessee	100.0	0.0	0.0	0.0	0.0	0.0	0.0

INCIDENCE OF ALL INTESTINAL PARASITES IN TEN SOIL PROVINCES IN TENNESSEE.

SOIL PROVINCES	Total Examined	Ascaris		Trichuris		Hymenolepis Nana		Enterobios Vermicularis		Hookworms	
		No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
1 Unaka Mountain Range	223	129	58	132	59	5	2	0	0	153	69
2 Valley East Tennessee	175	14	8	17	10	5	3	0	0	22	14
3 Cumberland Plateau	290	119	41	72	25	13	4	6	2	222	77
4 N. E. Cumberland Plateau	63	8	13	10	16	6	10	3	5	21	33
5 East Highland Rim	117	26	22	65	56	10	9	0	0	16	14
6 Central Basin	90	2	2	4	4	3	3	0	0	0	0
7 West Highland Rim	56	3	5	6	11	1	2	0	0	1	2
8 Appalachian Border	52	1	2	1	2	3	6	1	2	3	6
9 Upper Coastal Plain	347	3	1	1	1	15	4	1	1	57	16
10 Plateau West Tennessee	78	0	0	2	3	6	8	0	0	0	0

of the hookworm in the various soils also was made. This survey showed that only in two soil provinces was there a true hookworm problem. These are on the Cumberland Plateau and the Unaka Mountain Range. The intensity of hookworm infestation in Tennessee, even in areas where it is highest, was found to be only moderately severe. The nature of the top soil was found to be the outstanding variable among the factors which influence the incidence and intensity of hookworm infestation in this state.

Intensive control measures will be instituted in these areas. The preceding charts prepared on the basis of the survey show the intensity of hookworm infestation and incidence of all intestinal parasites by soil provinces of Tennessee.

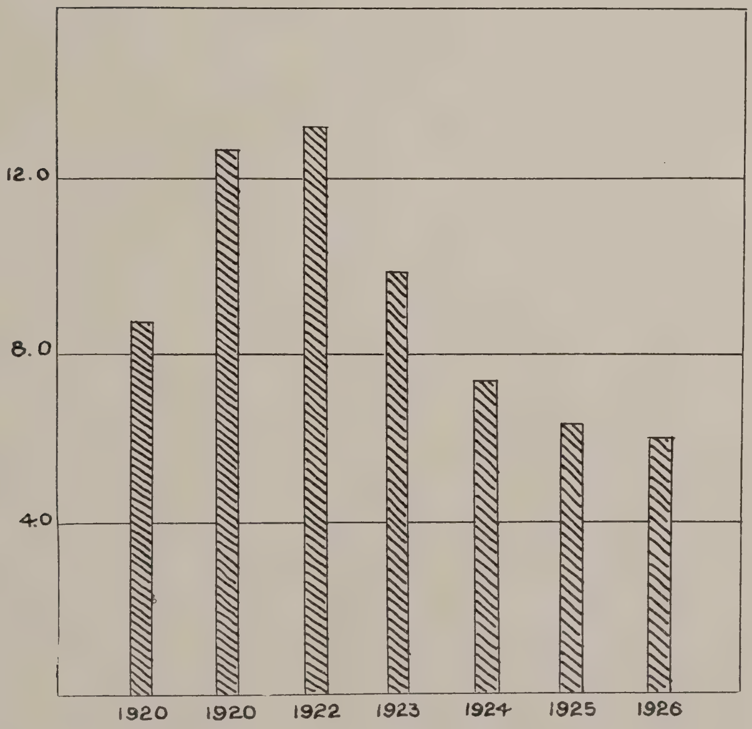
Type of Premises Where Hookworm is Common.

Malaria—Malaria is confined for the most part to the western section of the state in the valleys of the Mississippi and Tennessee rivers. There has been a gradual diminution in the incidence of the disease in recent years without any very extensive or intensive rural control measures. This has been due, in part, to the increasing amounts of farm land being brought under cultivation. Malaria is still, however, excessively prevalent. Four of the five counties bordering the Mississippi river and two of the counties in the next tier back from the river recently have established full-time health departments, and control work is being done on a county basis.

The mortality rates of malaria in Tennessee for the last few years have been, per 100,000 population, as given in the accompanying chart:

In August, 1925, malaria was reported in White and Putnam counties in the eastern part of the middle division of the state.

Malaria Death Rate
Tennessee
1920 — 1926



Death Rate per 100.000 population

An investigation revealed a situation bordering on a malaria epidemic in a territory contiguous to an impounded water supply.

The measures used in White and Putnam counties consisted of clearing the basin of floatage and standing timber, the raising and lowering of the water level together with some oiling, screening and quinine prophylaxis. A resurvey of this area made in 1926 showed that the reduction in cases amounted to about 60 per cent. This is an example of the value of malaria control measures properly directed.

In connection with anti-malarial activities in the flooded areas of the state on the Mississippi river, quinine both as a curative and a prophylactic agent is being distributed. The plan further provides for the screening of homes of cases and carriers to the extent of the funds available.

ACTIVITIES, TRACHOMA HOSPITAL

Knoxville, Tennessee

July 1, 1925—June 30, 1927

	1926	1927
Old cases, trachoma	1,892	1,687
New cases, trachoma	113	131
Total attendance	2,527	2,375
Total number treatments	2,589	2,307
Average daily attendance	6.92	6.51
Impaired vision from trachoma	55	82
Corneal opacity from trachoma	12	15
Blindness one eye from trachoma	2	0
Ulcer from trachoma	11	18
Pannus from trachoma	12	22
Entropion from trachoma	12	10
Photophobia from trachoma	97	84
Conjunctivitis	147	160
Operations	140	166
Pamphlets on trachoma distributed	105	33
House to house visits	194	26
Persons in houses visited	899	88
Trachoma cases in houses visited	49	21
Schools visited	20	2
Pupils examined in schools	3,155	617
Trachoma cases in schools	48	13

Trachoma—The surveys on trachoma conducted by the U. S. Public Health Service indicate that trachoma is markedly prevalent only in the eastern half of the state. The Service has been engaged in anti-trachoma work in the state since 1916. The disease seems to have decreased both in severity and in extent during that period. The number of cases treated in the Trachoma Hospital, established in Knoxville by the U. S. Public Health Service during the biennial period is shown in the table below. Some educational work has been done both from the hospital and through the full-time county health organizations in that section of the state.

FIELD INVESTIGATIONS AND VISITS

July 9, 1925—Dayton, Rhea County, advisory visit concerning sanitation in connection with preparations for the Scopes trial.

September 5, 6—Flat Creek, Bedford County, advisory visit in connection with control of outbreak of diphtheria.

September 10—Montgomery County, advisory visit in connection with suspected epidemic meningitis.

October 6, 7—Kingsport, Sullivan County, investigation of prevalence of typhoid fever.

October 13—Franklin, Williamson County, advisory visit in connection with outbreak of poliomyelitis.

October 21-24—Orme, Marion County, investigation of typhoid fever epidemic.

November 14—Mt. Pleasant, Maury County, investigation of suspected smallpox.

November 19—Springfield, Robertson County, investigation of typhoid fever outbreak.

January 20, 21, 1926—Knoxville, Knox County, advisory visit in connection with typhoid fever investigation by City Health Bureau.

January 26—Alexandria, DeKalb County, investigation of recent prevalence of typhoid fever.

February 19—Middleton, Hardeman County, advisory in connection with quarantine of case of smallpox.

March 24, 25—White County, investigation of outbreak of suspected dysentery.

April 14, 15—Knoxville, Knox County, advisory in connection with city typhoid investigation and reorganization of city epidemiological service.

July 17-19—Kingsport, Sullivan County, investigation of prevalence of typhoid fever.

September 7—Cumberland Furnace, Charlotte, Dickson (all in Dickson County), advisory concerning administration of typhoid vaccine by physicians.

September 13-16—Dyersburg, Dyer County, investigation of epidemic of gastro-enteritis, food poisoning type.

November 2—Morristown, Hamblen County, advisory concerning quarantine of cases of communicable disease.

December 3—Waverly, Humphreys County, investigation of cases of typhoid fever.

January 2-4, 1927—Wilson, Smith, Trousdale and Sumner Counties, advisory visit in connection with flood.

January 18—Loudon, Loudon County, investigation of cases of typhoid fever.

February 2, 3—Paris, Henry County, investigation of cases of typhoid fever.

February 24—Cleveland, Bradley County, institution of campaign for diphtheria prevention.

March 8, 9—Franklin, Williamson County, application of appraisal form to activities in Williamson County.

March 17—Lawrenceburg, Lawrence County, advisory as to quarantine of smallpox cases.

March 28—Knoxville, Knox County, advisory concerning increased incidence of pellagra in Knoxville.

April 19-21—Lake, Obion, Dyer, Lauderdale and Shelby Counties, advisory in connection with flood.

April 25-28—Lake, Obion, Dyer, Lauderdale and Shelby Counties, advisory in connection with flood.

May 31-June 1—Cleveland, Bradley County, advisory in connection with morbidity reporting.

June 22—Columbia, Maury County, advisory relative to typhoid fever cases in Columbia Institute.

June 27—Clarksville, Montgomery County, advisory relative to cases of smallpox.

June 28—Columbia, Maury County, investigation of cases of typhoid fever in Columbia Institute.

June 29—Knoxville, Knox County, advisory as to city of Knoxville's study of typhoid fever incidence.

June 30-July 1—White's Creek, Davidson County, investigation of cases of typhoid fever.

REVISION OF REGULATIONS GOVERNING CONTROL OF COMMUNICABLE DISEASES

A revision of the regulations governing the notification, prevention and control of communicable diseases in this state was made. The U. S. Public Health Service assigned an officer to assist in this work. The regulations were reviewed by other members of the U. S. Public Health Service and members of a Committee on the Control of Communicable Disease of the American Public Health Association, and finally harmonized in all essential details with the ideas of all the persons with whom the matter was discussed. These regulations received the approval of the U. S. Public Health Service. The approval of the Attorney-General, both as to form and legality, was given December 23, 1926.

The regulations became effective early in 1927. It is believed that Tennessee has, in these revised regulations, the most modern and best practice in communicable disease control. Copies of these regulations were sent to all practicing physicians in the state.

There was prepared as a part of the booklet to contain the regulations referred to, a manual of instruction for health officers in which was taken up in a brief manner the essential requirements for the control of the various communicable diseases. Some information of a general nature was included which may serve to make the booklet still more valuable. References to the specific duties of physicians, health officers, etc., as set forth in the law of the state were also included.

MILK-BORNE GASTRO-ENTERITIS CAUSED BY SALMONELLA SUIPESTIFER

An investigation was made of an outbreak of gastro-enteritis which occurred in Dyersburg early in September, 1926. About 150 persons were affected. Epidemiological investigation showed that the causative agent was confined to the one milk supply, and probably to one delivery of that milk supply. A complete report of this outbreak, together with bacteriological findings, is contained in the Journal of the American Medical Association, November 5, 1927, Vol. 89, pp.1584-1587.

COOPERATION WITH LOCAL HEALTH OFFICERS

From their position and the nature of their duties, the local health authorities are responsible for the control of communicable diseases. Prevention requires prompt, energetic action, and the area to be covered and time required are too great for

Assembled for Vaccination.

the state to effectively control outbreaks in their very incipiency from the central office. It was felt, therefore, that the greatest usefulness of his division lay in assisting local health authorities in communicable disease control.

A copy of Chapter 519, Acts of 1905, relative to the prevention of the introduction and spread of communicable diseases in the state and a revised copy of the Regulations Governing the Control of Communicable Diseases were sent to each health officer in the state. A smallpox vaccination technique, recommended by the department, and an outline of control measures for local authorities in outbreaks of poliomyelitis were likewise distributed.

ACTIVITIES IN CONNECTION WITH FLOODS

Early in January, 1927, a trip was made through portions of the counties of Davidson, Wilson, Smith, Trousdale and Sumner flooded by the Cumberland river. The health officers were interviewed and conditions investigated which might make possible an outbreak of some of the communicable diseases. Overcrowding of refugees and the possibility of communicable disease were considered, as well as specific measures of prophylaxis. Letters sent to health authorities of the several counties contained information on sanitation, communicable disease control and precautions to be taken when moving back into recently flooded areas. A trip was made over portions of the city of Nashville at the request of the city health officer.

In April, 1927, counties in West Tennessee affected by the flood of the Mississippi were visited, and conferences held with health officials, Red Cross workers and other interested individuals. Tennessee was fortunate in having most of the counties affected already under full-time county health departments. These departments formed a nucleus around which extensive and intensive health work could be built. Measures for the prevention of outbreaks of communicable disease were promptly instituted and there did not occur in the flooded areas any disturbance because of the presence of communicable diseases.

ASSISTANCE TO OTHER DIVISIONS

The Division of Epidemiology has endeavored at all times to be of assistance in furthering the programs of the other divisions of the State Department of Public Health. This is true particularly of the assistance given the full-time county health departments in matters concerning communicable disease control which inevitably arise.

GOITER SURVEY

The occurrence of what was thought by observers to be an excess number of enlarged thyroids in certain sections of the state was brought to the attention of this division. In order to be authoritatively advised concerning this condition, the assistance of the U. S. Public Health Service was requested and Surgeon Robert Olesen was assigned to this state. Answers to letters addressed to full-time health officers of the state gave no indication of any number of enlarged thyroids in any section of the state except in parts of East Tennessee. Dr. Olesen in company with members of the staff, visited several sections of the state for the purpose of determining the incidence of goiter and to demonstrate his method of examination.

MISCELLANEOUS

The former director of the division edited "Health Briefs." The mailing list was revised and the new list put into use, beginning with the April, 1926, issue. The limit of the mailing list at that time was placed at 1,000.

Posters on malaria, spitting, and the common drinking cup were designed and printed. Material has been prepared for a bulletin on typhoid fever and a preliminary draft of this bulletin has been written.

A child hygiene survey of the city of Nashville was completed.

A division exhibit on the spread of communicable diseases was prepared and shown at the East Tennessee Fair at Knoxville.

Assistance was given in the preparation for a department exhibit shown at the annual meeting of the State Medical Association.

The chart, "Guide for Teachers—Communicable Diseases in School Children" has been distributed to school superintendents in the state.

DIVISION OF VITAL STATISTICS

The functions of this division are:

To administer the vital statistics laws of the state.

To act as custodian of all birth and death records.

To make studies of population trends, especially as affected by births and deaths.

HISTORICAL

Prior to 1914 the county court clerks of the several counties of the state were permitted to register births when requested by the parents or by the physician who attended the birth; similar provisions were made to record deaths. Within the past few years the State Department of Public Health has attempted to make some use of these early records but in some instances they were not preserved and in almost all others they were found to be very incomplete and of little use.

The law under which registration is carried on at the present time was passed by the legislature in 1913 and became effective on January 1, 1914. Under this law the State Commissioner of Public Health, by virtue of his office, is the State Registrar of Vital Statistics. He is charged with the enforcement of the law and acts as custodian of records. The state is divided into registration districts, corresponding to the civil districts of the counties. In each of these civil districts, or in some instances a con venient grouping of civil districts, some local person is appointed as registrar who administers the law locally. He receives the certificates of births and deaths, and issues burial permits and permits for the removal of dead bodies. The original certificates of births and deaths are sent to the state registrar, by the local registrar, and they are permanently bound and filed. The local registrar is paid twenty-five cents by the county for each certificate of birth or death recorded.

Three years after this law went into effect the state was admitted to the U. S. Registration Area for Deaths, with over 90 per cent of all deaths registered. Admission to the U. S. Registration Area for Births, however, was not secured until 1927.

SPECIAL FEATURES

At the beginning of the present biennial period, there were slightly in excess of 900 local registrars on duty but by rearrangement and combination of districts, this number was reduced to 802 at the close of the period.

In July, 1925, the division moved into the Memorial Building. The new quarters have proved far more satisfactory than the ones formerly occupied. A fireproof vault was constructed as a part of the building, and in this the birth and death certificates are kept.

A new system of binding has been perfected. Covers are purchased in quantities and the certificates are inserted as received. The expense of binding has been very materially reduced. Formerly a great deal of inconvenience was experienced by having certificates away from the office for binding and not infrequently certificates were lost.

A punch-card system has been installed by which each item on the certificate is given a code number and the number recorded on a punched card. At any time these cards can be run through a sorting machine and data can be obtained easily. This has been found far more satisfactory than the old method of manual tabulation.

A complete map of the state has been prepared, showing in each county the registration districts and the number assigned each. Such items as railroads, highways, mail routes and similar factors influencing registration are shown. By this method, the State Registrar gets a complete picture of the local situation and frequently problems which formerly necessitated a visit to the field can be adjusted by correspondence.

In May, 1927, the state was admitted to the U. S. Registration Area for Births, with over 90 per cent of all births registered. Contrary to experiences in other states, this was accomplished without a single prosecution. Workers from the department, particularly from the Division of Vital Statistics and from the Division of Health Education, together with others made available by the U. S. Census Bureau, covered every county in the state. Physicians, midwives, undertakers, registrars and others concerned with registration were visited. A state-wide educational campaign concerning the necessity for registration was instituted. Delinquent registrars were replaced, and registration districts were combined in accordance with the present-day system of communication and movement of people. The combined

TABLE 1—ACTIVITIES.

Year	Births Recorded	Stillbirths Recorded	Deaths Recorded	Certified Copies Issued	Certificates Queried Approximately	Certificates Transcribed
1925	53,036	2,411	27,757	2,021		83,204
1926	56,103	2,546	31,409	3,342		90,058
Total	109,139	4,957	59,166	5,363	40,000	173,262

NOTE—The calender year is used for purpose of vital statistics, consequently the report cannot be made to conform with the state fiscal periods.

TABLE 11—BIRTHS: STATE OF TENNESSEE.

Year	Total		White		Colored	
	Number	Rate	Number	Rate	Number	Rate
1925	53,036	21.7	45,169	22.7	7,867	17.3
1926	56,103	22.7	46,834	23.5	9,269	19.4

NOTE—Birth rate per 1,000 population.

TABLE 11 (Continued.) DEATHS: STATE OF TENNESSEE.

Year	Total		White		Colored	
	Number	Rate	Number	Rate	Number	Rate
1925	27,757	11.3	19,332	9.7	8,425	18.6
1926	31,409	12.7	22,188	11.1	9,221	19.3

NOTE—Crude death rate per 1,000 population.

efforts of all persons concerned with registration, together with the growing appreciation on the part of the general public as to the value of registration, made this accomplishment possible.

The State Department of Public Health now supplies each registrar and physician and others concerned with registration, with a calendar on which certain duties to be performed on given days are prominently identified. Suggestions for the improvement of registration also appear on the calendar.

ANALYSIS

During the year 1926, 56,103 births and 31,409 deaths were recorded; the births being in excess of the deaths by 24,694. During the period 1917 to 1926 inclusive, the birth rate increased from 21.9 per 1,000 to 22.7 per 1,000 and the death rate fell from 13.5 per 1,000 to 12.7 per 1,000. Tuberculosis, all forms, claimed 3,625 persons in 1926; the trend however, is downward. In 1917, the rate was 190.5 per hundred thousand population, while in 1926 the rate was 146.9; throughout this period the colored rate has been nearly twice that of the white. Typhoid fever still remains an important cause of death in spite of the fact that it is clearly a preventable disease; yet the trend is encouraging, since the rate dropped from 38.3 per hundred thousand in 1917 to 25 in 1926. The reduction in malaria has been most encouraging. In 1917 the rate was 20.4 per hundred thousand, while in 1926 it was 6.1 per hundred thousand. During this ten-year period, the curve of measles has varied, reaching a peak about once every three years. On analyzing these figures it has been found that the highest death rate occurred during the first two years of life, demonstrating the necessity of protecting children until they are better able to withstand the infection. Diphtheria, despite the well-known means for prevention, remains far too prevalent. In 1917 the rate was 15 per hundred thousand and in 1926 it was 11.3 per hundred thousand. During the intervening period the rate fluctuated up and down. The highest death rate occurred below the age of ten. Approximately three-fourths of the deaths occurred below five years of age, consequently, this is the period during which the greatest amount of good can be done by the administration of toxin-antitoxin. Infant mortality shows a very definite downward trend, although during 1926 it

DEATHS BY IMPORTANT CAUSES

YEAR	Tuberculosis—All Forms			Typhoid	Diphtheria
	Total	White	Colored	Total	Total
1917	4379	2725	1654	881	340
1918	4551	2690	1861	694	236
1919	3792	2293	1499	642	302
1920	3710	2348	1862	434	375
1921	3202	1985	1217	605	376
1922	3519	2206	1313	495	303
1923	3632	2364	1268	513	240
1924	3556	2193	1364	585	206
1925	3353	2099	1254	641	185
1926	3525	2238	1387	617	278

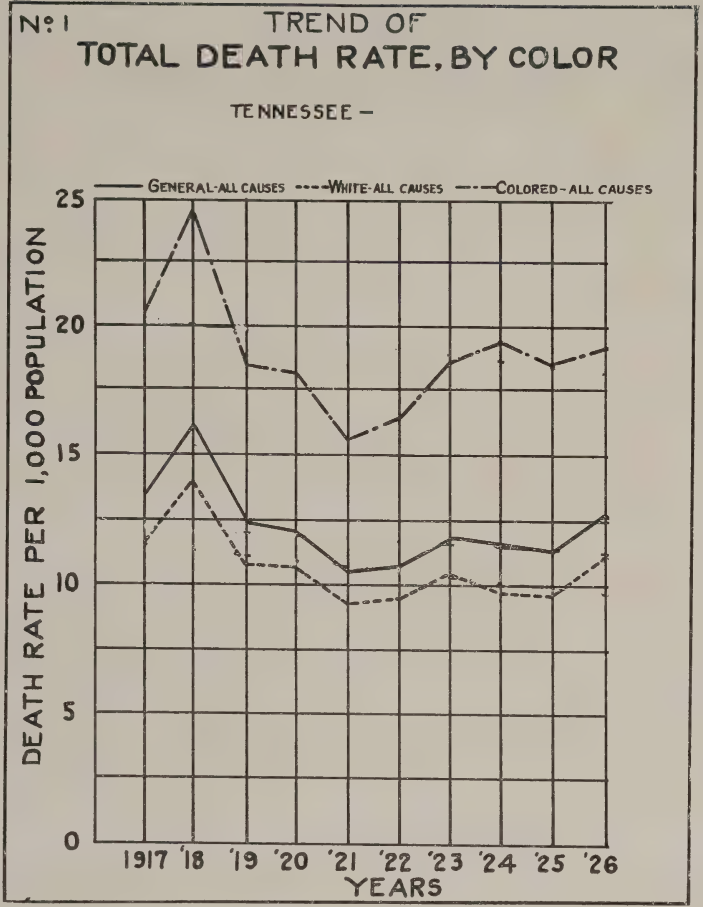
YEAR	Heart Disease	Diarrhea and Enteritis	Automobiles
	Total	Total	Total
1917	2451	1680	66
1918	2882	1406	87
1919	2163	1239	116
1920	2065	984	135
1921	1644	934	137
1922	1459	738	160
1923	1609	889	171
1924	2707	838	222
1925	2738	887	272
1926	3031	948	305

was slightly higher than during the two preceding years. The rate for 1926 was 79.3 per thousand live births, which is slightly in excess of that for the Registration Area of the United States. The drop from 95.5 in 1917 to its present level is encouraging, still the waste of child life is far too great. Most encouraging progress has been made in the reduction of deaths from diarrhea and enteritis under two years. Since 1917 the death rate has been brought down to 38.4 which is slightly more than half of what it was in 1917. Childbirth still continues to exact its toll; during 1926, 382 women lost their lives from what should be a normal and physiological function. The trend is somewhat downward, yet far too high, since during the ten-year period under consideration deaths associated with childbirth continue to average about 400 per annum. Deaths from heart disease have increased about 20 per cent over the rate of 1917. This disease claimed 3,031 persons in 1926, or a death rate of 122.8 per hundred thousand.

VITAL STATISTICS BULLETIN

Detailed tables on vital statistics have been omitted from the report. This information will be found in a separate bulletin of the department entitled "Tennessee Vital Statistics." This bulletin is somewhat of a departure from the usual state bulletin of vital statistics and its essential features are here set forth:

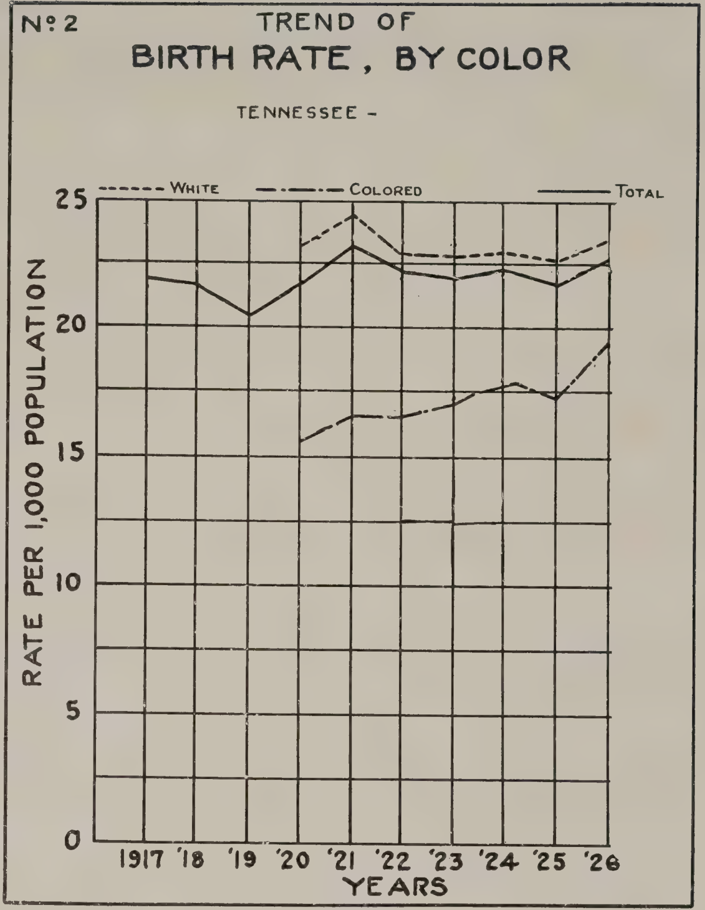
Two factors determine largely the usefulness of a statistical table, assuming, of course, that the data presented are accurate: (1) timeliness and (2) adaptation of the classification used to the purpose which the table should serve. The value of a vital statistics publication is determined by the emphasis on local conditions rather than elaborate and exhaustive analysis for the state as a unit. It is more important for the health officer to know that there were five deaths from malaria in one county and none in another than it is to know that for the state as a whole the malaria death rate was 6.10 per 100,000 population, and that five white females between 45 and 50 years of age died of malaria somewhere in Tennessee. Complete data of all types are available for persons interested, but only pertinent information of value to health officers is published in the bulletin.



N° 1

TREND OF
TOTAL DEATH RATE, BY COLOR

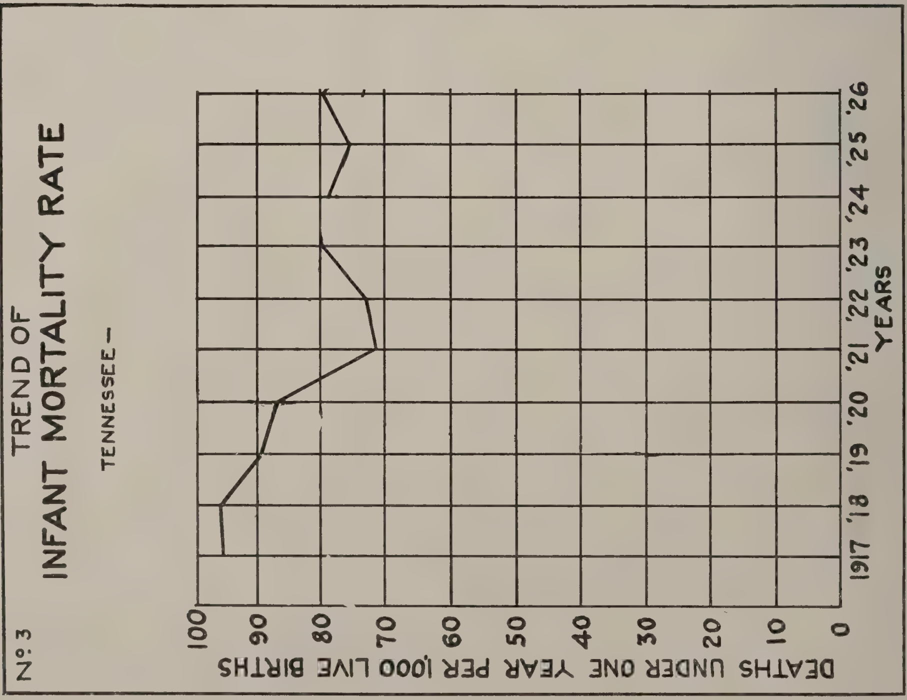
TENNESSEE –



N° 2

TREND OF
BIRTH RATE, BY COLOR

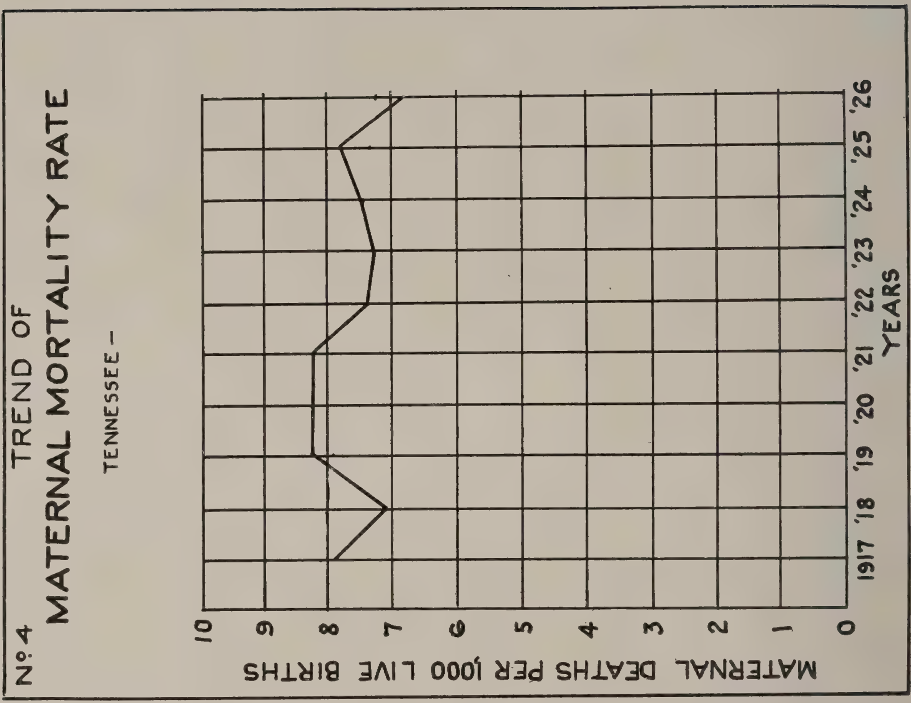
TENNESSEE –



No. 3

TREND OF
INFANT MORTALITY RATE

TENNESSEE—



No. 4

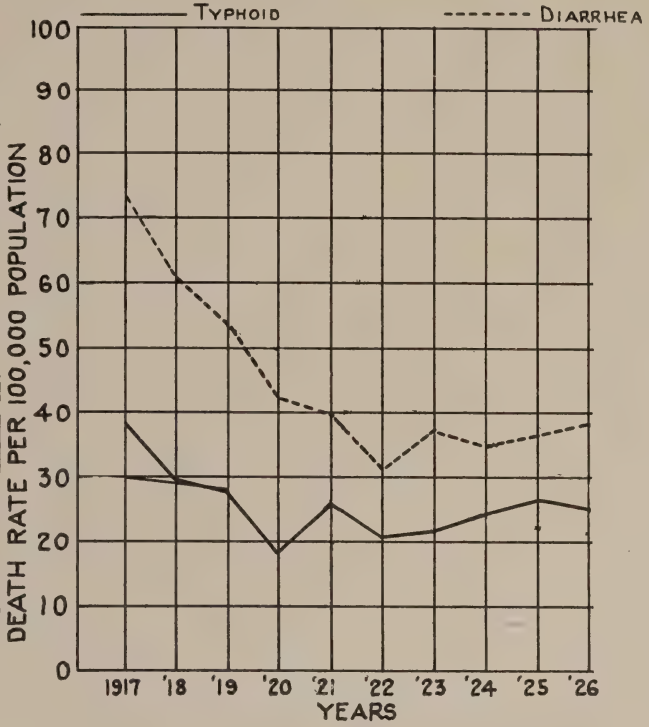
TREND OF
MATERNAL MORTALITY RATE

TENNESSEE—

Nº 5

TREND OF MORTALITY
FROM TYPHOID FEVER AND FROM DIARRHEA AND ENTERITIS (UNDER TWO YEARS)

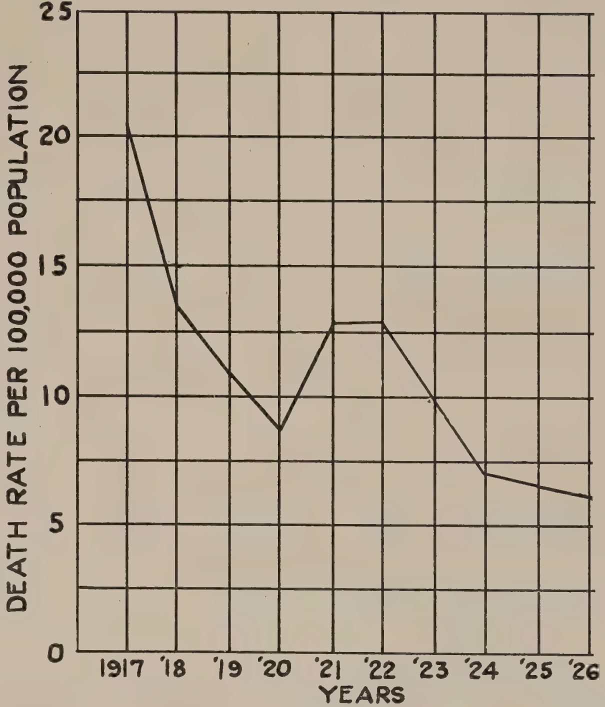
TENNESSEE —

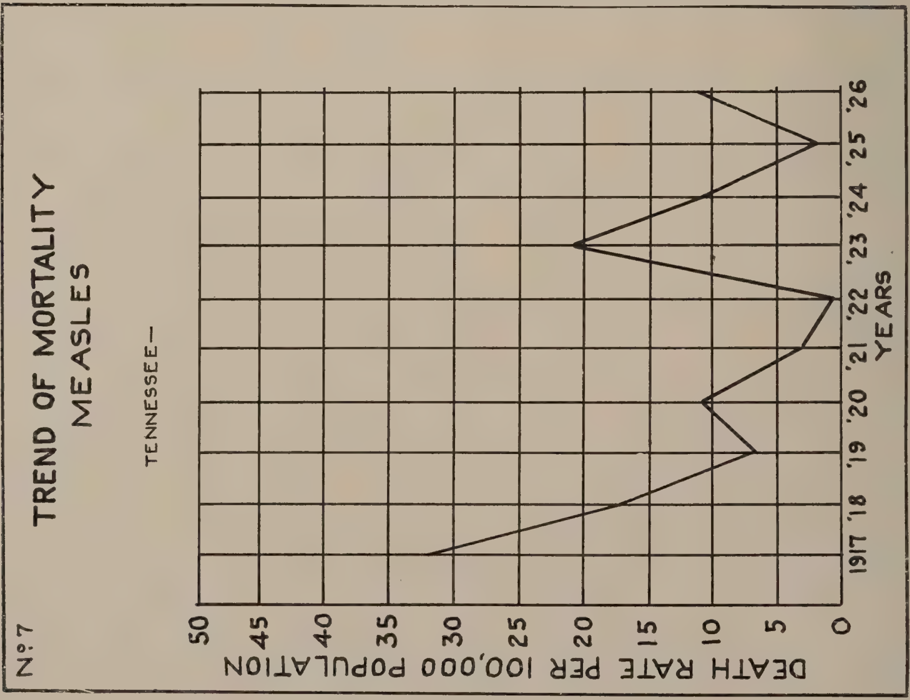


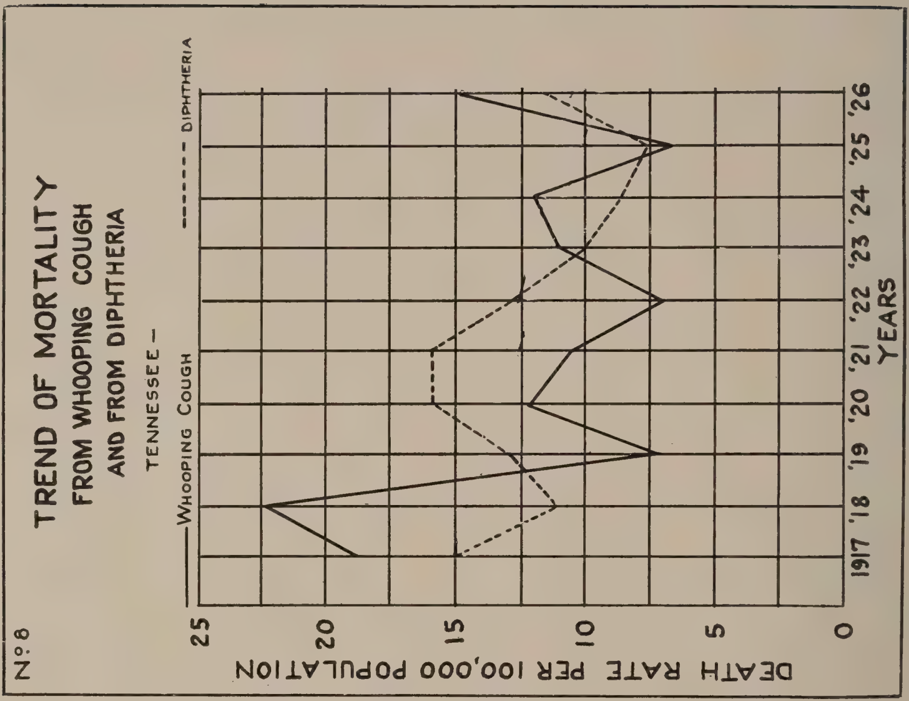
Nº 6

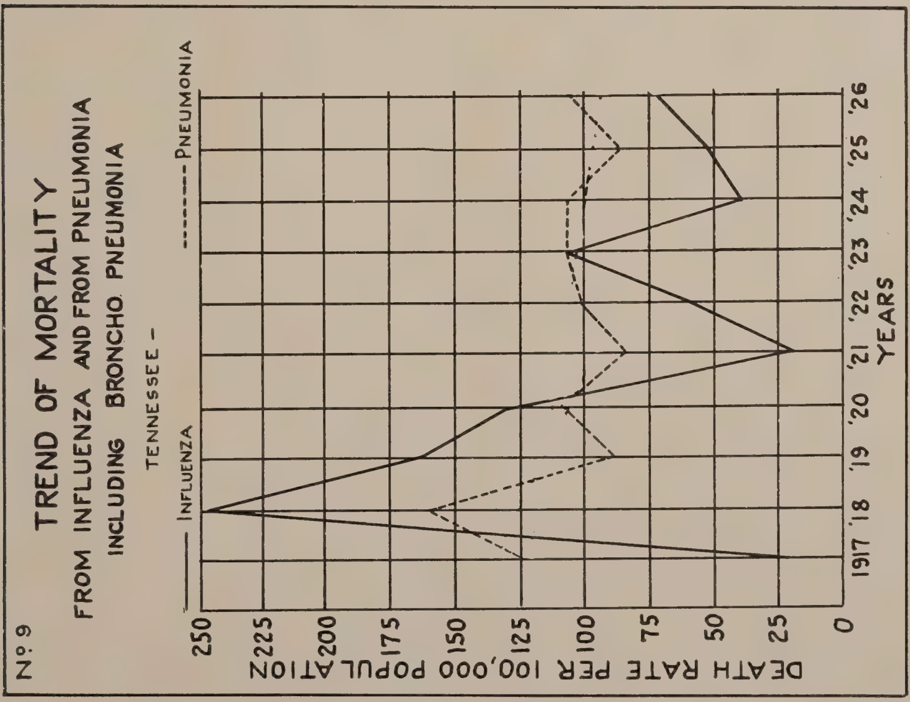
TREND OF MORTALITY
MALARIA

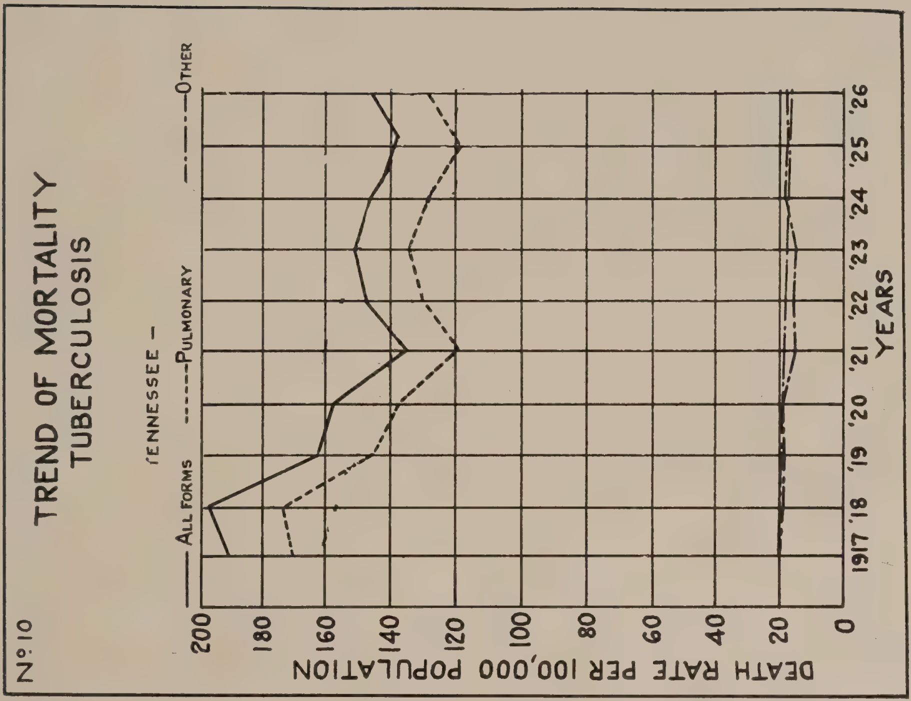
TENNESSEE —




N°7
TREND OF MORTALITY
MEASLES
TENNESSEE—
DEATH RATE PER 100,000 POPULATION
50
45
40
35
30
25
20
15
10
5
0
1917
'18
'19
'20
'21
'22
'23
'24
'25
'26
YEARS


N°8
TREND OF MORTALITY
FROM WHOOPING COUGH
AND FROM DIPHTHERIA
TENNESSEE—
WHOOPING COUGH
DIPHTHERIA
DEATH RATE PER 100,000 POPULATION
25
20
15
10
5
0
1917
'18
'19
'20
'21
'22
'23
'24
'25
'26
YEARS

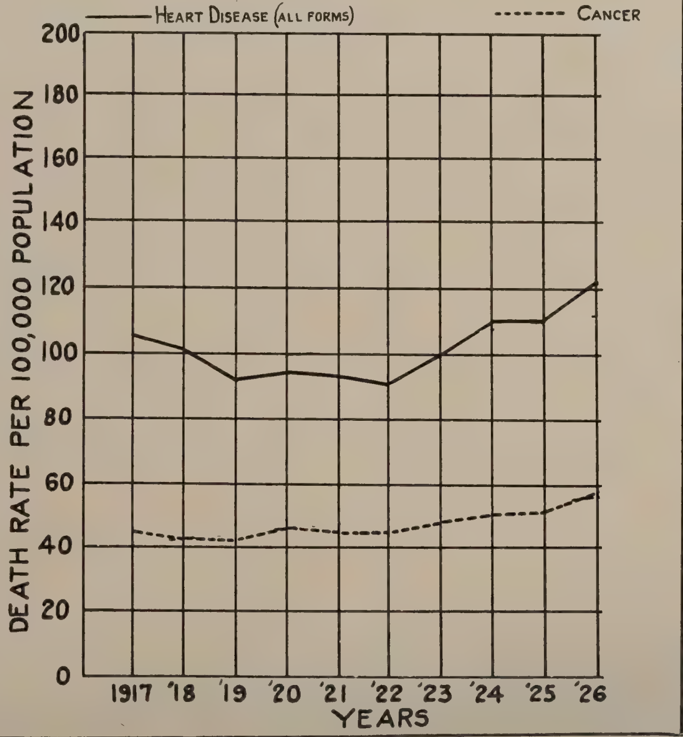

Nº 9
TREND OF MORTALITY
FROM INFLUENZA AND FROM PNEUMONIA
INCLUDING BRONCHO PNEUMONIA
TENNESSEE –
INFLUENZA
PNEUMONIA
DEATH RATE PER 100,000 POPULATION
250
225
200
175
150
125
100
75
50
25
0
1917
'18
'19
'20
'21
'22
'23
'24
'25
'26
YEARS


Nº 10
TREND OF MORTALITY
TUBERCULOSIS
TENNESSEE –
ALL FORMS
PULMONARY
OTHER
DEATH RATE PER 100,000 POPULATION
200
180
160
140
120
100
80
60
40
20
0
1917
'18
'19
'20
'21
'22
'23
'24
'25
'26
YEARS

No. 11

TREND OF MORTALITY
FROM HEART DISEASE AND FROM CANCER

TENNESSEE –

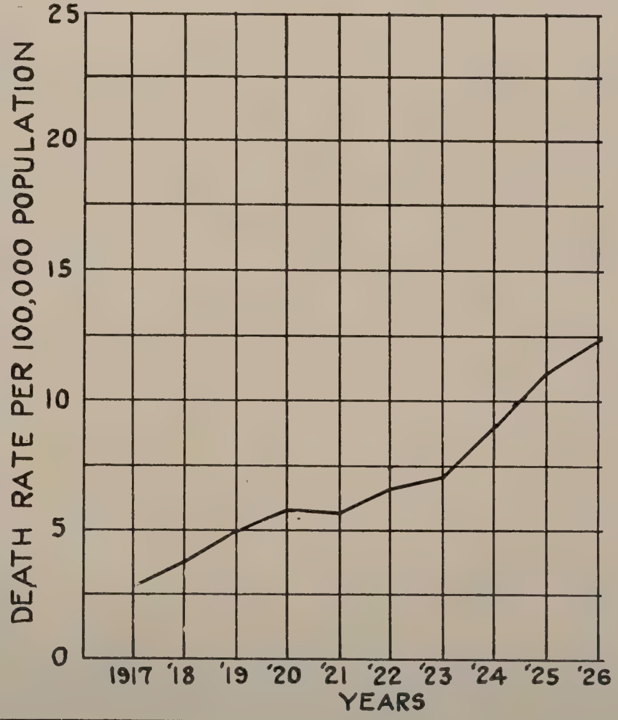


No. 12

TREND OF MORTALITY
AUTOMOBILE ACCIDENTS

Excluding collisions with trains or trolley cars

TENNESSEE –

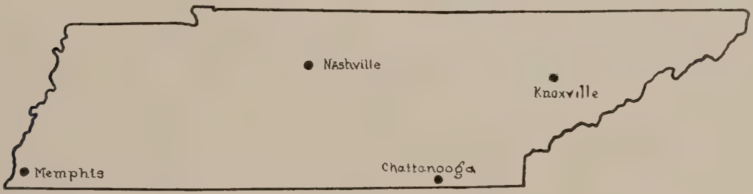


DIVISION OF LABORATORIES

The remarkable development of medical science during the past thirty years, to a great extent can be credited to the laboratory. Prevention and control of disease are built around the laboratory. It has made possible the prompt and accurate diagnosis of communicable diseases and the detection of carriers of disease. The determination of the sanitary quality of water, milk and other foods rests largely with the laboratory. The promptness with which the services are rendered determines their effectiveness. Lack of laboratory service, particularly in rural areas, has seriously handicapped the physician in caring for his patients and delayed the health officer in instituting measures for control. To make the service more efficient, the system of mailing specimen containers has been improved and branch laboratories have been established.

LOCATION OF LABORATORIES

Laboratory service is furnished through a laboratory in Nashville, and a branch laboratory located in each of the following cities: Memphis, Knoxville and Chattanooga.



ADMINISTRATION

The Director of Laboratories has charge of the central laboratory and exercises supervision over the state-wide service of the branch laboratories.

The central laboratory is maintained by the state. The branch laboratories are operated in conjunction with the health department of the cities in which they are located. The branch laboratories are furnished various supplies, such as containers, stationery, forms, and other materials necessary in the operation of a public health laboratory. The cities provide and maintain quarters, supply telephone service, equipment and laboratory up-keep. The state pays part of the salaries of technical employees. The location of the various laboratories is such that physicians and health officers receive a maximum of service. The postal authorities have been consulted with regard to the quickest and most available service to a given laboratory, in order to insure the delivery of mail as promptly as possible.

REORGANIZATION

Prior to the beginning of the fiscal year 1925, the work was badly disorganized. The central laboratory, at Nashville, had its work done in three different laboratories and the director was on a part-time basis. These three laboratories have since been consolidated in new quarters procured and equipped by the state, and full-time workers have been employed. Formerly, each of the branch laboratories operated as an isolated unit and employed different methods of keeping records and reporting. At the present time all the laboratories employ a standard technique in the examination of specimens; uniform records are kept; standard report forms are sent out; and the territory to be served is allocated on the basis of mailing time.

SERVICES OF THE LABORATORY

Routine examinations are now being made as follows:

(1) Sputum for tubercle bacilli and other microorganisms.

(2) Diphtheria: Material from nose and throat, directly from the membranous areas, is examined by slides and then by culture, and by virulence tests in many instances.

(3) Throat swabs: For Vincents' angina, streptococcic sore throats, scarlet fever (hemolytic streptococcus), etc.

(4) Wassermann (Kolmer) and Kahn tests on blood and spinal fluid for syphilis.

(5) Typhoid and paratyphoid: Tests made by the Widal method to determine typhoid or paratyphoid "A" and "B" fevers. The whole blood is cultured when available.

(6) Carriers: Feces and urine are examined to detect typhoid, paratyphoid and dysentery carriers; nose and throat secretions for diphtheria, scarlet fever, and meningococci carriers.

(7) Gonorrhea and ophthalmia neonatorum: Pus smears from urethra, cervix, and eyes for gonococci; and also complement fixation tests.

(8) Intestinal parasites: Feces for hookworm, roundworm, pinworm, tapeworm, and ova of other intestinal parasites; also amebic dysentery, etc.

(9) Water analysis: Bacteriological analysis of public water supplies, state institutions, schools, etc.; also from sources suspected of typhoid and other contaminations when recommended by the Division of Sanitary Engineering, or by a local health officer.

(10) Milk analysis: Bacteriological examination; also estimation of butter fat.

(11) Anthrax and glanders: Specimens from animals supposed to be infected with these diseases.

(12) Malaria: Blood smears for malaria parasites.

(13) Rabies: Brains of animals for evidence of rabies, and inoculation tests into rabbits and guinea pigs for confirmation, especially in cases of negative microscopic findings.

(14) Spinal fluids: For meningococci, tubercle bacilli, and other microorganisms.

(15) Tularemia (Rabbit fever.)

(16) Typhus fever (Brills disease.)

(17) Undulant fever (American Malta fever), bovine and porcine abortus variety.

Special Examinations: The diagnosis of pathological specimens, making autogenous vaccines, urinalyses, etc., is occasionally made where the patient is indigent and where such service is urgently needed.

Materials Manufactured:

(a) Typhoid vaccine: The central laboratory manufactures and supplies the triple typhoid vaccine plus two other strains of the Eberth bacillus to the various county health units, the various state institutions, the part-time county health officers, and to all physicians of the state.

(b) Silver nitrate: In the early part of the year 1926, the central laboratory began the manufacture of silver nitrate ampules for free distribution to physicians and midwives of the state to be used in the prevention of ophthalmia neonatorum. At first, the cost was about one cent per ampule. At the present time it is one-fourth of a cent. This great reduction in cost has been effected by special apparatus designed and manufactured by the regular laboratory personnel.

(c) Anti-rabic vaccine: Anti-rabic vaccine (both the 14 dose Semple method and the original 21 dose Pasteur method). By cooperating with a local laboratory which aids in the manufacture of this vaccine, the treatments can be distributed at very much lower cost than the commercial rate. The treatments are distributed to physicians at actual cost, since the State Department of Public Health has no funds by which such a treatment can be given free of charge.

Biologicals Distributed: A contract has been made with a reputable biological manufacturer whereby the following supplies can be secured at greatly reduced prices: diphtheria antitoxin, tetanus antitoxin, scarlet fever antitoxin, diphtheria toxin-antitoxin mixture, Schick and Dick test material, smallpox vaccine, and other biologicals. These biologicals are properly stored in Nashville, and are distributed to physicians wishing to take advantage of this special reduction.

TOTAL NUMBER OF SPECIMENS EXAMINED BY THE CENTRAL AND BRANCH LABORATORIES

	July 1, 1925 to June 30, 1926	July 1, 1926 to June 30, 1927
Central Laboratory	28,704	31,978
Memphis Branch	3,539	5,571
Knoxville Branch	4,680	5,088
Chattanooga Branch	808	5,511
	37.731	48,148

SPECIMENS EXAMINED BY CENTRAL AND BRANCH LABORATORIES, JULY 1, 1925 TO JUNE 30, 1926

	Central Laboratory	Memphis Branch	Knoxville Branch	Chattanooga Branch	Total No. Exams.	Total No. Positive Exams.
1. Blood:						
(1) Widal tests:						
(a) B. typhosus	1,991	467	163	13	2,634	842
(b) B. paratyphosus A	891	5	....	....	896	13
(c) B. paratyphosus B	871	1	2	....	874	10
(2) Cultures:						
(a) B. typhosus	228	8	3	....	239	58
(b) Other microorganisms	.....	....	....	....	.....	.....
(3) Plasmodia	341	410	124	11	886	.....
(a) Tertian	.....	....	....	....	.....	78
(b) Aestivo autumnal	.....	....	....	....	.....	39
2. Milk:						
(1) Bacteriological	317	....	1	20	338	37
(2) Chemical	142	4	....	19	165	25
(3) Sediment	.....	18	....	....	18	5
3. Nose and Throat:						
(1) Cultures:						
(a) B. diphtheriae	1,172	215	97	48	1,532	391
(b) Carrier	3,249	103	32	....	3,384	471
(c) Virulence test	535	....	....	....	535	390
(2) Meningococcus	101	4	1	....	106	10
(3) Carriers	359	....	....	....	359	29
(4) Other microorganisms	.....	....	4	....	4	4
4. Pus and Excreta:						
(1) Spirochaeta Vincenti	235	26	....	....	261	74
(2) B. tuberculosis	94	....	5	6	105	15
(3) Koch-Weeks bacillus	.....	....	....	....	.....	.....
(4) Staphylococcus	116	....	6	....	122	50
(5) Streptococcus	131	1	....	....	132	43
(6) Other microorganisms	.....	....	1	1	2	1
5. Rabies:						
(1) Negri bodies:						
(a) Dog	674	80	62	4	820	372
(b) Cat	74	....	3	....	77	36
(c) Cow	36	....	1	....	37	17
(d) Horse	18	....	....	....	18	8
(e) Other animals	3	1	4	....	8	3
(2) Inoculations: (rabbits and guinea pigs	374	....	14	4	392	206
6. Spinal Fluid:						
(1) Meningococcus	84	....	2	....	86	4
(2) Pneumococcus	5	1	....	....	6	1
(3) B. tuberculosis	99	1	1	....	101	4
(4) Other microorganisms	9	....	....	....	9	.....
7. Sputum:						
(1) B. tuberculosis	2,207	362	434	48	3,051	1,057
(2) Other microorganisms	.....	3	2	....	5	5
8. Stools:						....

	Central Laboratory	Memphis Branch	Knoxville Branch	Chattanooga Branch	Total No. Exams.	Total No. Positive Exams.
(1) Parasites: No. exam. made..	612	2	111	30	755	.....
(a) Ascaris lumbricoides	.....	....	....	....	.....	52
(b) Entamoeba coli	.....	....	....	....	.....	36
(c) Entamoeba histolytica	.....	....	....	....	.....	10
(d) Musca domestica, larvae..	.....	....	....	....	.....	.....
(e) Oxyuris vermicularis	.....	....	....	....	.....	13
(f) Taenia nana	.....	....	....	....	.....	34
(g) Taenia saginata	.....	....	....	....	.....	1
(h) Trichuris trichiura	.....	....	....	....	.....	40
(i) Uncinaria	.....	....	....	....	.....	20
(j) Other parasites	.....	....	....	....	.....	1
(2) Other microorganisms	.....	....	....	....	.....	.....
(3) Cultures:						
(a) B. typhosus	145	....	44	1	190	35
(b) B. paratyphosus A.......	126	....	....	....	126	6
(c) B. paratyphosus B.......	130	....	....	....	130	4
(d) B. dysenteriae	110	....	1	....	111	5
(e) Other microorganisms ...	.....	....	....	1	1	.....
9. Urine:						
(1) Cultures:						
(a) B. typhosus	58	....	....	....	58	7
(b) B. paratyphosus A.......	52	....	1	....	53	.....
(c) B. paratyphosus B.......	56	....	....	....	56	2
(d) Other microorganisms ...	.....	....	....	....	.....	.....
(2) Analyses:						
(a) Chemical	59	4	844	37	944	32
(b) Microscopical	59	5	847	34	945	32
10. Venereal:						
(1) Gonococcus:						
(a) Microscopical	368	355	204	30	957	211
(b) Complement fixation	317	....	....	....	317	103
(2) Treponema pallidum	117	....	6	....	123	32
(3) Wassermann tests:						
(a) Blood	5,278	1,106	845	145	7,374	1,746
(b) Spinal fluid	37	6	3	1	47	12
(4) Kahn tests:						
(a) Blood	5,278	50	....	124	5,452	1,261
(b) Spinal fluid	37	....	....	....	37	10
11. Water:						
(1) Bacteriological	1,402	284	667	203	2,556	533
(2) Chemical	.....	....	....	....	.....	.....
12. Miscellaneous:	.....	11	110	15	136	2
(a) B. anthracis	77	6	....	....	83	7
(b) Pathological specimens	30	....	....	....	30	15
(c) Blood counts	.....	....	35	13	48	.....
Grand Total	28,704	3,539	4,680	808	37,731	8,560

SPECIMENS EXAMINED BY CENTRAL AND BRANCH LABORATORIES JULY 1, 1926 TO JUNE 30, 1927

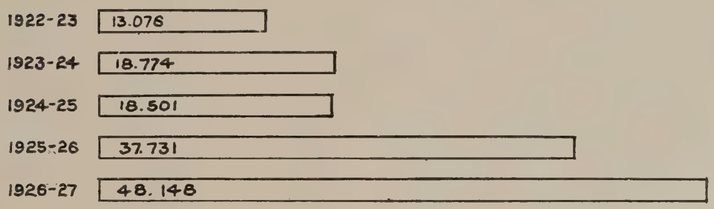
	Central Laboratory	Memphis Branch	Knoxville Branch	Chattanooga Branch	Total No. Exams.	Total No. Positive Exams.
1. Blood:						
(1) Widal tests:						
(a) B. typhosus	2,277	674	194	81	3,226	1,081
(b) B. paratyphosus A	1,184	3	4	5	1,196	7
(c) B. paratyphosus B	1,219	3	5	5	1,232	12
(2) Cultures:						
(a) B. typhosus	398	20	56	1	475	103
(b) Other microorganisms	.....	2	....	3	5	.....
(3) Plasmodia:	142	527	22	140	831	.....
(a) Tertian	.....	....	....	....	.....	79
(b) Aestivo autumnal	.....	....	....	....	.....	21
(c) Quartan	.....	....	....	....	.....	1
2. Milk:						
(1) Bacteriological	528	49	58	114	749	90
(2) Chemical	232	23	54	123	432	34
3. Nose and Throat:						
(1) Cultures:						
(a) B. diphtheriae	1,497	524	198	1,518	3,737	962
(b) Carrier	3,395	199	20	....	3,614	1,079
(c) Virulence test	1,182	2	....	2	1,186	1,104
(2) Meningococcus	110	....	....	....	110	1
(3) Carriers	493	....	4	....	497	65
(4) Other microorganisms	.....	....	15	12	27	7
4. Pus and Excreta:						
(1) Spirochaeta Vincenti	353	17	1	4	375	89
(2) B. tuberculosis	153	1	2	1	157	17
(3) Koch-Weeks bacillus	.....	....	....	....	.....	.....
(4) Staphylococcus	170	1	....	....	171	60
(5) Streptococcus	202	1	....	....	203	41
(6) Other microorganisms	.....	....	1	3	4	1
5. Rabies:						
(1) Negri bodies:						
(a) Dog	597	68	208	11	884	437
(b) Cat	64	9	40	1	114	53
(c) Cow	26	2	9	....	37	20
(d) Horse	11	1	....	....	12	7
(e) Other animals	1	....	4	....	5	1
(2) Inoculations: (rabbits and guinea pigs)	466	....	43	1	510	268
6. Spinal Fluid:						
(1) Meningococcus	104	3	2	....	109	2
(2) Pneumococcus	.....	....	....	....	.....	.....
(3) B. tuberculosis	113	....	....	....	113	4
(4) Other microorganisms	.....	....	....	3	3	1
(5) Cell count and globulin	.....	....	....	4	4	.....
7. Sputum:						
(1) B. tuberculosis	2,239	305	617	149	3,310	1,244
(2) Other microorganisms	.....	....	3	2	5	1

SPECIMENS EXAMINED BY CENTRAL AND BRANCH LABORATORIES JULY 1, 1926, TO JUNE 30, 1927

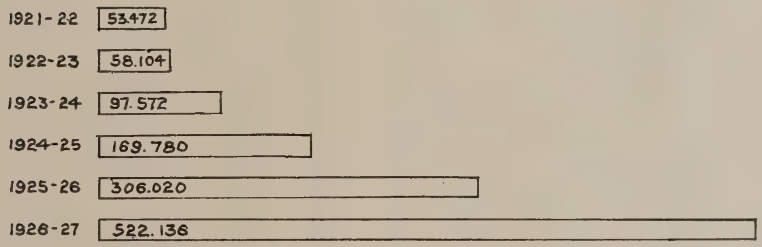
	Central Laboratory	Memphis Branch	Knoxville Branch	Chattanooga Branch	Total No. Exams.	Total No. Positive Exams.
8. Stools:						
(1) Parasites: No. exam. made...	618	15	68	175	876	.....
(a) Ascaris lumbricoides	.....	....	....	....	.....	46
(b) Entamoeba coli	.....	....	....	....	.....	29
(c) Entamoeba histolytica	.....	....	....	....	.....	6
(d) Musca domestica, larvae..	.....	....	....	....	.....	.....
(e) Oxyuris vermicularis	.....	....	....	....	.....	15
(f) Taenia nana	.....	....	....	....	.....	23
(g) Taenia saginata	.....	....	....	....	.....	9
(h) Trichuris trichiura	.....	....	....	....	.....	22
(i) Uncinaria	.....	....	....	....	.....	26
(j) Other parasites	.....	....	....	....	.....	9
(2) Other microorganisms	.....	....	....	....	.....	.....
(3) Cultures:						
(a) B. typhosus	318	24	91	12	445	75
(b) B. paratyphosus A........	297	....	....	....	297	3
(c) B. paratyphosus B.........	308	....	....	....	308	9
(d) B. dysenteriae	294	1	5	2	302	8
(e) Other microorganisms ...	.....	....	....	....	.....	.....
(4) Occult blood	.....	....	....	1	1	1
9. Urine:						
(1) Cultures:						
(a) B. typhosus	93	7	3	13	116	10
(b) B. paratyphosus A.......	93	....	....	....	93	1
(c) B. paratyphosus B.......	94	....	....	....	94	4
(d) Other microorganisms	.....	5	2	2	9	2
(2) Analyses:						
(a) Chemical	89	15	94	149	347	51
(b) Microscopical	89	9	95	142	336	53
10. Venereal:						
(1) Gonococcus:						
(a) Microscopical	391	127	131	188	837	270
(b) Complement fixation	298	....	....	....	298	122
(2) Treponema pallidum	84	....	....	8	92	13
(3) Wassermann tests:						
(a) Blood	4,900	1,538	2,120	751	9,309	2,224
(b) Spinal fluid	51	27	4	1	83	17
(4) Kahn tests:						
(a) Blood	4,900	726	....	1,059	6,685	1,539
(b) Spinal fluid	51	10	....	....	61	12
11. Water:						
(1) Bacteriological	1,684	627	895	591	3,797	807
(2) Chemical	.....	....	....	....	.....	.....
12. Miscellaneous:	.....	....	17	103	120	.....
(a) B. Anthracis	125	3	....	....	128	4
(b) Pathological specimens	45	3	1	....	49	25
(3) Blood counts	.....	....	2	131	133	.....
Grand Total	31,978	5,571	5,088	5,511	48,148	12,327

Growth of Laboratory Service

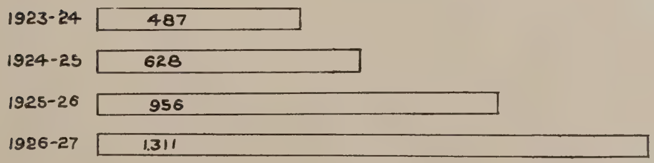
Total number of specimens examined each year since 1922



Typhoid Vaccine manufactured and distributed since 1922



Number of physicians using laboratory service



Typhoid Vaccine Manufactured and Distributed

(Number of Doses)

July 1, 1925 to June 30, 1926	306,020
July 1, 1926 to June 30, 1927	522,136
	828,156

Silver Nitrate Ampules Manufactured and Distributed

(Number of Ampules)

*March 1, 1926 to June 30, 1926	13,160
July 1, 1926 to June 30, 1927	25,940
	39,100

Antirabic Treatments Distributed

(Number of Treatments)

July 1, 1925 to June 30, 1926	211
July 1, 1926 to June 30, 1927	383
	594

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*Service inaugurated March 1, 1926.

RESEARCH

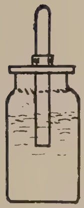
The old idea that the accurate performance of routine work was the only function of state laboratories is dying out. Laboratory science is progressive, and for advancement two things are necessary: study and encouragement. Persons competent for investigation should be offered opportunity. The better laboratories constantly stimulate research, as shown by worth-while articles appearing in the literature. Many questions remain unsolved relating to the practical work of the laboratory with regard to speed of diagnosis, to simplified but accurate methods of examination, to quicker and better information on water or milk conditions, etc. Few laboratories, at present, have a budget admitting research in pure science, valuable as it may be, but the stimulation of practical research will pay for itself many times over. The degree of efficiency of the laboratories will depend on the opportunities and encouragement given them for study and investigation.

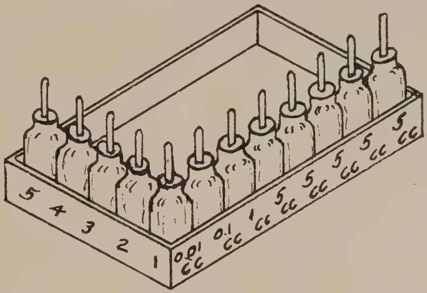
Within the past two years several lines of research of a practical character have been pursued, the more important of which are reported. A more complete description of apparatus and methods will be sent upon request.

A Simplified Procedure in Determining B. Coli in Water

There was a need for simplification of the procedure for determining B. coli in water which at the same time would not jeopardize accuracy. The apparatus devised consists of a fermentation bottle fitted with a special top, also special trays by which a large number of samples of water can be examined in a small incubator using only one-tenth of the space ordinarily required.

Experiments have shown that five samples of water can be examined in less time and at the same cost as a single sample of

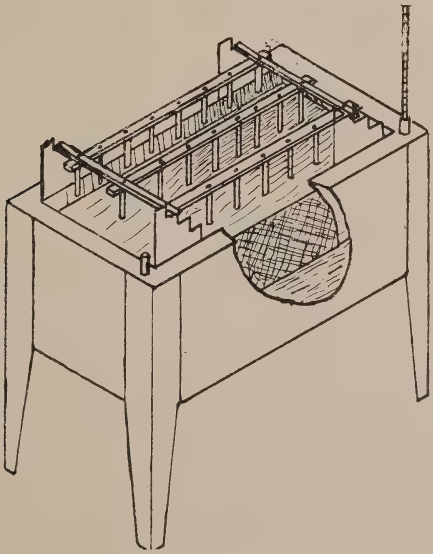




water by the older procedures. The method has been found to be thoroughly reliable and should appeal to all laboratories, especially to state laboratories where a large number of samples of water are examined daily. A full description of the apparatus is contained in a reprint of the department entitled "A Simplified Procedure for Determining B. Coli in Water."

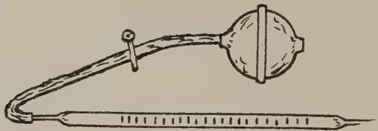
A New Apparatus for the Manufacture of Silver Nitrate Ampules

This apparatus is very simple and inexpensive. An ordinary tinner can make one for $10.00. Its operating expense is about one-fourth less than the complicated electrical apparatus ordinarily



used. The apparatus is made of galvanized iron. Its inside dimensions are 40 cm. long by 15 cm. wide and 15 cm. deep. It is surrounded by a water jacket providing for about 5 cm. of water space. It may be fitted with a gas thermoregulator, but this is not necessary since an ordinary Bunsen burner is all that is required. The beeswax composition can be melted and the temperature regulated in about 15 minutes. Within the water jacket is placed a thermometer to determine the proper temperature. Constant temperature is maintained by lowering or raising the Bunsen flame. The proper size of the flame can be determined by a little practice.

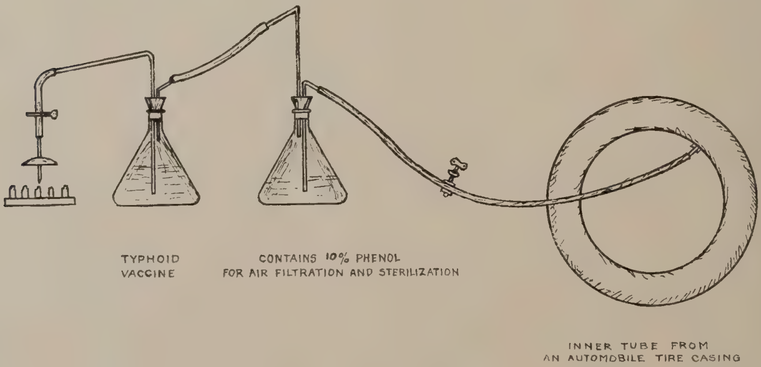
Silver Nitrate Filler



A simple silver nitrate filler has been made. It consists of an ordinary, graduated 10 c.c. pipette with rubber tubing and a large rubber bulb. With this simple apparatus, one can fill the ampules with great ease and rapidity.

Apparatus for Filling Typhoid Vaccine Ampules

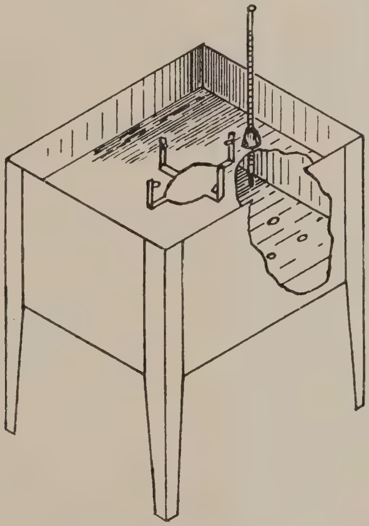
This apparatus is very simple, practical, and time saving. It requires only one person to operate, thereby saving the time of another person who ordinarily was required in the old method of filling ampules. The vaccine is placed in a liter flask fitted with a


TYPHOID VACCINE
CONTAINS 10% PHENOL FOR AIR FILTRATION AND STERILIZATION
INNER TUBE FROM AN AUTOMOBILE TIRE CASING

perforated rubber stopper. A glass tube reaching from the bottom of the flask connects on top with rubber tubing which in turn is attached to another glass tube that is tapering for the purpose of filling the ampules. A clamp is used to regulate the flow of vaccine. Pressure is supplied by an automobile inner tube inflated to the proper degree. The air passes through 10 per cent phenol contained in a flask, thereby preventing contamination of the vaccine.

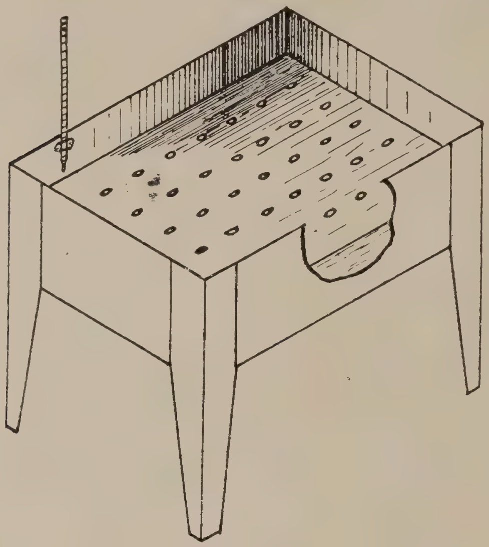
Inactivation Baths

A new inactivation bath has been devised by this division for the killing of typhoid bacilli in large quantities at their minimum thermal death point. The main features of this bath are that it is inexpensive (any tinner can make it out of galvanized iron) and that it is provided with special clips by which large flasks containing the typhoid vaccine can be held firmly in a definite position, at the same time permitting agitation at frequent intervals during the inactivation process. The inside dimensions of this bath are 31 cm. long by 26 cm. wide by 19 cm. deep. It may be provided with a gas thermoregulator.



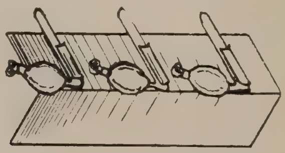
Wassermann Baths

The Wassermann inactivation baths have no special features except for the fact that they are quite inexpensive, simple in construction, and easy to manipulate. They are made of galvanized iron, and any tinner can manufacture them. The inside dimensions are 70 cm. long by 54 cm. wide by 15 cm. deep. The racks or baskets containing the serum to be inactivated rest upon a perforated false bottom, raised about 10 cm. above the bottom proper. A gas thermoregulator can be used to maintain a constant temperature, but a large rose burner serves practically as well. Owing to the large volume of water present, the temperature can be kept quite constant by regulating the flame of the burner.



Racks for Holding Fermentation Tubes

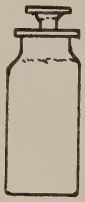
The apparatus consists of a tin rack provided with special clips arranged in such a manner that the fermentation tubes will

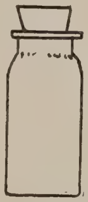


be held firmly in an upright position, thus enabling one person to make inoculations in a very short space of time as compared with the old procedure of filling receptacles with sand, cotton, or other materials for a resting base. The racks are made to hold six fermentation tubes, or if desired, a rack holding a dozen or more tubes can be made by any tinner. They can be made of tin or galvanized iron and painted with aluminum paint. They are quite inexpensive and convenient.

Water Bottles

As a result of experiments, it is now possible to discard the regulation wide mouth, ground glass stoppered water bottle as ordinarily used by laboratories in collecting samples of water. The laboratory now uses an ordinary plain bottle provided with a cork entirely covered with tin foil.





Experiments show that sterilization of the bottles can be rendered just as effective as with the ground glass stoppered bottle, and that samples are less liable to become contaminated. This is due to the fact that the ground glass stoppered bottle may leak, and by capillary attraction, the contaminated water from the outside of the bottle may gain access to the interior. Dye and bacteriological experiments have demonstrated this to be a fact. The cost of a ground glass, wide mouth stoppered bottle is about 40 cents, whereas, the ordinary bottle, fitted with a cork covered with tin foil, will cost about 5 cents.

Virulent Diphtheria Bacilli in Fowls

In 1923, a paper was read before the Southern Medical Association, calling attention to the finding of virulent diphtheria in fowls, this being the first instance in which this microorganism had ever been isolated from fowls. With this in view, the condition was studied intensively. Studies have extended over a period of several years, and two papers have been published during that time.

A summary of the last paper published is as follows:

(1) Two hundred and fifty-six human cases were investigated in which virulent Klebs-Loeffler bacilli (acute and chronic) existed in families owning fowls suffering with ailments such as roup, fowl diphtheria, cholera, etc.

(2) The total number of sick fowls examined was 1126. Out of this number there were two instances in which several fowls in each flock harbored virulent diphtheria bacilli.

(3) In one instance, it was evident that the fowls harbored virulent Klebs-Loeffler bacilli at least two weeks before the appearance of diphtheria in the family owning the fowls.

Conclusion: From the investigations it is quite evident that fowls can transmit virulent diphtheria bacilli to man. Although the condition is comparatively rare, it opens up a new field of inquiry concerning the means by which virulent Klebs-Loeffler bacilli are disseminated among human beings.

For a detailed report, write for reprint "Further Observations of Virulent Diphtheria Bacilli in Fowls." The Southern Medical Journal, August, 1925. Pages 577-581.

Atypical Strains of B. Typhosus Occurring in Wilson and Sumner Counties

For a number of years, specimens of blood sent in for the Widal test, coming from Wilson and Sumner counties, have given a surprisingly large number of negative tests in cases showing typical typhoid symptoms (rose spots, enteric hemorrhage, etc.). Investigation as to the reason for this was undertaken. Quite a number of these cases were tested for tularemia, typhus, and abortus fevers, with negative results. Blood cultures were obtained from five cases which revealed B. typhosus, presenting somewhat atypical features when freshly isolated. The feces showed the identical microorganism in all five of the cases. The urine was negative except in one case. In this case, the organism which was isolated was identical to those recovered from the blood and feces.

Description of the Atypical B. Typhosus: The freshly isolated microorganism presented all the tinctorial, cultural, and immunological tests of the B. typhosus, except the following: When freshly isolated, it failed to agglutinate with serum obtained from cases of the ordinary typhoid fever, but did agglutinate with the serum derived from the patient, as well as the other cases tested.

Immunization of rabbits with this microorganism gave practically the same results as in the human. Prolonged cultivation and numerous transplants have markedly increased the agglutinative power of the organism until at the present time it rivals the Rawlins and Mt. Sinai type of agglutinin producers.

These organisms are now being used in testing the blood for agglutinins in cases from Wilson and Sumner and surrounding counties. The typhoid vaccine manufactured by the state not only includes the triple vaccine but also the Wilson and Sumner county strains.

The Wilson and Sumner county strains are nearly identical, except for a slight difference in their agglutinative powers. These two strains, when freshly isolated, show little or no motility. Flagella staining shows only a few flagellae which apparently possess little vibrating action. However, repeated transplants in bouillon or even agar causes a great many flagellae to appear analogous to the typical Eberth bacillus. After prolonged cultivation and numerous subcultures, the two strains identically conform to the B. typhosus, according to agglutination absorption tests.

Comparison of Kahn and Kolmer-Wassermann Tests

An intensive study was made on 25,000 sera, comparing the Kahn with the Kolmer-Wassermann test. As a result of these investigations the following conclusions are offered: The Kahn test is simple, specific, reliable and consistent with the Kolmer-Wassermann test to a high degree. Report can be made on the same day the specimen is received. One test serves as a check on the other and when used jointly will detect positive sera which otherwise would be negative. More than one method in the serum diagnosis of syphilis tends to more accurate results. A single system should not be adopted; hence, the laboratory uses the Kahn test and the Kolmer modification of the Wassermann test on all sera examined for lues. For a detailed report, write for the reprint: "The Kahn Test Compared with the Kolmer-Wassermann Test in 25,000 Sera." The Southern Medical Journal. February, 1927, pages 147-151.

Milk-Borne Gastro-Enteritis Caused by Salmonella Suipestifer

The Division of Epidemiology, in collaboration with the Division of Laboratories, investigated an outbreak of gastro-enteritis occurring at Dyersburg, Tennessee. The infection was definitely traced to a single dairy, and the microorganism, isolated from the stools of several patients, proved to be the salmonella suipestifer (Bacillus cholerae suis). The bacteriological and seriological studies are too lengthy and technical to be given in this report. A full report appeared in the Journal of the American Medical Association, November 5, 1927. Vol. 89, pp. 584-587.

The summary and conclusion are as follows:

(1) The outbreak of gastro-enteritis, here described, involved more than 150 people.

(2) Symptoms of toxic nature were noted, such as severe headache, nausea and vomiting, diarrhea, and profound muscular weakness. A few cases showed delirium. The incubation period ranged from eight to thirty-six hours. Recovery was practically complete within one week.

(3) The vehicle of infection was a raw milk supply.

(4) It seems probable that the infection gained entrance to the milk through lax measures in cleansing the udders and flanks of the cows.

(5) The organism isolated conforms in its morphology, tinctorial, and serological reactions, and virulence in rabbits to salmonella suipestifer (Bacillus cholerae suis).

(6) In review of the literature, no report of an outbreak caused by milk contaminated with salmonella suipestifer was revealed.

Proposed New Activities

A chemist will be added to the personnel of the Central Laboratory. Intensive investigations of tularemia, undulant fever (abortus fever), and typhus fever (Brills disease) are now in progress and diagnostic service for these diseases will be established as routine in obscure disease conditions. Release cultures of stools and urine of all typhoid fever cases will be insisted upon in the near future. Search for typhoid carriers in dairy or food handlers will be more systematic in the future. Release cultures from scarlet fever cases will be stimulated. The laboratory proposes to feature diphtheria toxin-antitoxin mixture for free distribution to health units, health officers, state institutions, schools and to practicing physicians.

DIVISION OF SANITARY ENGINEERING

Many problems with which state health departments have to deal involve questions of an engineering nature, particularly sanitary engineering. Nearly all state health departments, therefore, include a division or bureau of sanitary engineering. Sanitary engineering work in the various states is both advisory and supervisory and includes the following subjects: Water supplies, milk supplies, ice supplies, sewerage systems and sewage disposal, stream pollution, shellfish, trade-waste disposal, plumbing, garbage and refuse disposal, nuisances, offensive trades, abattoirs, building sanitation, housing, rat-proofing, fly eradication, swimming pools and bathing beaches, rural sanitation, epidemics (milk and waterborne), and malaria control. The Division of Sanitary Engineering of the Tennessee State Department of Public Health has been organized and developed along the same general lines. The work of the division is carried out through cooperation with officials of cities, counties, institutions and other official organizations, and with consulting engineers.

The function of the division is not to handle engineering projects in detail, but rather to supervise these projects by the enforcement of necessary sanitary regulations; to promote interest in improvements; to correlate efforts of various officials; and keep in close touch with conditions throughout the state. Investigations are made, data are obtained and study is given to particular problems arising, in order that the division may supply consultant service and advice. Promotional work is done to encourage improvement. Plans for new water works and sewerage systems and major improvements to existing systems are received, checked and approved before construction is commenced, and operation of the system is directed after construction.

HISTORY

A sanitary engineer was detailed to the Tennessee State Board of Health in 1919, by the United States Public Health Service, to make a survey of the state with regard to the sanitary engineering needs. He remained with the State Board of Health until the establishment of the Division of Sanitary Engineering, at which time he resigned from the Service and became director of the division.

The Division of Sanitary Engineering was made possible by the provision of funds by the State Legislature in 1921, and the division was officially organized July 1 of that year. The personnel consisted of two sanitary engineers and a secretary-stenographer. The service of the division has increased until at the present time there are four sanitary engineers including the director, and a secretary-stenographer.

SERVICES

The Division of Sanitary Engineering, early in its existence, made surveys of the public water supplies in the state and found that only a few were safe and that a small number of the towns and cities had sanitary sewerage systems.

Polluted water supplies and lack of adequate sewerage systems are the principal means for the transmission of typhoid fever and other intestinal diseases. Realizing, that water polluted with sewage was playing an important role in the causation of the excessive typhoid death rate in Tennessee, one of the first services of the Division of Sanitary Engineering was to remedy these unhealthful and dangerous conditions.

As funds and personnel have been increased, the general activities of the division have been broadened until the following sanitary engineering problems are being given attention: *Primary Activities*—The primary activities of the division consist of: Supervision of public water supplies, supervision of sewage disposal, stream sanitation, school sanitation, approval of plans for new water works and sewerage systems, certification of railroad water supplies, promotion of new water works and sewerage systems, consultant service to city and county health departments and to divisions of the State Health Department, and malaria control (Anopheles mosquito). **Secondary Activities*—The secondary activities of the division consist of: Municipal sanitation, tourist camp sanitation, swimming pool sanitation, supervision of roadside water supplies, issuing of bulletins, and milk supply sanitation.

*Note—A secondary activity does not necessarily mean that the activity is secondary in importance. It simply means that there is insufficient personnel to take care of the problem at the present time.

PUBLIC WATER SUPPLIES

Much of the time and efforts of this division have been devoted to public water supplies. It was necessary to obtain complete data on each supply in the state including systematic bacteriological examinations, since this information is used as a basis of procedure in this important activity.

TABLE 1

PUBLIC WATER SUPPLIES GROUPED ACCORDING TO TREATMENT

GROUP I

SUPPLIES NOT EMPLOYING TREATMENT

LOCATION	SOURCE	OWNER
Alamo	Wells	P. (W. C. Mount)
Arlington	Wells	M.
Bells	Wells	Bells Water and Light Co.
Bemis	Wells	Bemis Bag Co.
Bluff City	Spring	M.
Bolivar	Wells	M.
Bradford	Wells	M.
Brownsville	Wells	M.
Bruceton	Wells	N., C. & St. L. R. R.
Butler	Spring	M.
Coal Creek	Springs	M.
Collierville	Wells	M.
Copper Hill	Spring	M.
Copper Hill (T. C. Co.)	Spring	Tennessee Copper Co.
Covington	Wells	M.
Cumberland Gap	Spring	L. M. U.
Dayton	Spring	M.
Decherd	Well	Decherd Milling Co.
Dresden	Wells	M.
*Ducktown	Springs-Well	Tennessee Copper Co.
Dyer	Wells	M.
Elizabethton	Spring	Mount. Spring Water Co.
Erin	Springs	A. T. Mitchum.
Erwin	Springs	A. R. Brown.
Fulton	Wells	M.
Gleason	Wells	M.
Grand Junction	Wells	A. B. Martin.
Greenfield	Wells	M.
Germantown	Wells	M.
Halls	Wells	T. G. Avery.
Henderson	Wells	Jackson Ry. & Lt. Co.
Henning	Wells	Henning Water & Ice Co.
Hillsboro	Spring	P.
Hohenwald	Spring	M.
Humboldt	River	M.
Huntingdon	Wells	Ky.-Tenn. Power & Lt. Co.
Jackson	Spring	M.
Jacksboro	Wells	John Bowman.
Jellico	Wells	M.
Kenton	Wells	M.
Lexington	Wells	M.
Martin	Wells	Ky.-Tenn. Operation, M.
McKenzie	Wells	M.
Milan	Wells	M.
Millington	Wells	M.
Monteagle	Wells	N., C. & St. L. R. R.
Mosheim	Spring	P.
Mountain City	Spring	P.
Newbern	Wells	M.

GROUP I—Continued

LOCATION	SOURCE	OWNER
Oakdale	Wells	So. R. R. Co.
Obion	Wells	M.
Oneida	Spring	Oneida Water Co.
Orme	Spring	B. C. C. & Co. co.
*Pikeville	Wells	Pikeville Granity Water Co.
Rogersville	Wells	M.
Rutherford	Wells	M.
*Sewanee	Wells-Spring	P.
Sharon	Wells	M.
Sequatchie	Spring	G. Sherman.
Somerville	Wells	M.
Tellico Plains	Wells	T. E. P. Co.
Trenton	Wells	M.
Trezevant	Wells	M.
Trimble	Wells	R. O. Fisher.
*Tullahoma	Wells	M.
Union City	Wells	M.
Walland	Wells	Schlooser Tannery.
Watertown	Wells	M.
Whiteville	Wells	M.
W. Tenn. Teachers' College.	Wells	State of Tennessee.

Total	70
(Includes Pikeville)	
Municipal	38
Private	32
Wells	50
Springs	19
Surface	1
Two Sources Available	4

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*Two sources of supply available.
M.—Municipal.
P.—Private.

GROUP 2

Supplies Employing Sterilization

Location	Source	Type Steriliz	Owner
Centreville	Spring	Hypochlorite	T. A. Bartlett.
Charleston	Spring	Hypochlorite	E. A. Edwards.
Cleveland	Spring	Liq. chlorine	M.
Cowan	Spring	Liq. chlorine	So. Cities Power Co.
Dickson	Spring	Liq. chlorine	M.
Dunlap	Spring	Hypochlorite	J. M. Lee.
Etowah	Spring	Liq. chlorine	Etowah Water & Lt. Co.
Fayetteville	Springs	Liq. chlorine	M.
Franklin	Springs	Liq. chlorine	M.
Jasper	Springs	Hypochlorite	Ranson Smith.
Jefferson City	Spring	Liq. chlorine	M.
Johnson City	Spring	Liq. chlorine	County.
LaFollette	Imp. Res.	Liq. chlorine	T. E. P. Co.
Lawrenceburg	Spring	Liq. chlorine	M.
Lebanon	Well	Liq. chlorine	M.
Loudon	Spring	Liq. chlorine	Harrison.
Lyle	Spring	Liq. chlorine	Tenn. Prod. Co.
Lynnville	Spring	Liq. chlorine	M.
Manchester	Spring	Hypochlorite	M.
Maryville	Wells	Liq. chlorine	M.
Mt. Pleasant	Spring	Liq. chlorine	M.
*Newport	Wells-Spring	Liq. chlorine	M.
Niota	Spring	Liq. chlorine	T. E. P. Co.
Orlinda	Spring	Liq. chlorine	L. P. Harned.
Portland	Springs	Liq. chlorine	M.
Richard City	Spring	Liq. chlorine	Penn. Dixie Cem. Co.
Rockwood	Springs	Liq. chlorine	M.
Sparta	Springs	Liq. chlorine	Caroline Thompson.
Sweetwater	Spring	Liq. chlorine	M.
Tazewell	Spring	Hypochlorite	Pat Crutchfield.
Waverly	Well	Liq. chlorine	A. W. Lucas.
Winchester	Spring	Liq. chlorine	So. Cities Power Co.

Total	33
Municipal	16
Private	17
Well	4
Spring	29
Surface	1
Two Sources Available	1

---

*Two sources of supply available.

M.—Municipal.

GROUP 3

SUPPLIES EMPLOYING SEDIMENTATION, FILTRATION AND STERILIZATION

Location	Source	Type Filtration	Type Sterilization	Owner
Alcoa	Little river.......	G.	Liq. chlorine..	Knox. Power Co.
Bristol	Spring	G.	Liq. chlorine..	M.
Clarksville ..	Cumberland river.	G.	Liq. chlorine..	M.
Columbia	Duck river.......	G.	Liq. chlorine..	So. Cities Pwr. Co.
Gallatin	Cumberland river.	G.	Liq. chlorine..	M.
Greeneville ..	Spring	G.	Liq. chlorine..	M.
Harriman ...	Emory river.....	G.	Liq. chlorine..	T. E. P. Co.
Kingsport ...	Imp. res.	G.	Liq. chlorine..	M.
Knoxville ...	Tennessee river...	G.	Liq. chlorine..	M.
Lenoir City..	Little Tenn. river.	G.	Liq. chlorine..	M.
Lewisburg ...	Imp. res.	G.	Liq. chlorine..	M.
Madisonville..	Spring	G.	Hypochlorite ..	M.
Mascot	Stream	G.	Ultra violet...	Am. Zinc.
McMinnville .	Barren Fork.....	G.	Liq. chlorine..	M.
Morristown ..	Springs	G.	Liq. chlorine..	M.
Murfreesboro.	Springs-wells	G.	Liq. chlorine..	M.
Old Hickory.	Cumberland river.	G.	Liq. chlorine..	DuPont Rayon.
*Pikeville ...	Sequatchie river..	G.	Liq. chlorine..	Pikeville Gr. W. Co.
Pulaski	Richland creek ..	G.	Liq. chlorine..	M.
Shelbyville ..	Duck river.......	G.	Liq. chlorine..	So. Cities Pwr. Co.
So. Pittsburg.	Tennessee river...	G.	Liq. chlorine..	So. Cities Pwr. Co.
Springfield ..	Stream	G.	Liq. chlorine..	M.
Tiptonville ..	Reelfoot lake	G.	Liq. chlorine..	M.
Chattanooga..	Tennessee river...	G.	Liq. chlorine..	City Water Co.
Spring City..	Spring	P.	Hypochlorite ..	M.

Total	25
(Including Pikeville)	
Municipal	16
Private	9
Wells	0
Springs	6
Surface	19
Gravity	23
Pressure	2

---

*Two sources of supply available.

G.—Gravity.

P.—Pressure.

GROUP 4

SUPPLIES EMPLOYING FILTRATION AND STERILIZATION

Location	Source	Type Filtration	Type Sterilization	Owner
Athens	Spring	P.	Liq. chlorine..	Ingleside Water Co.
Clinton	Spring	P.	Liq. chlorine..	M.
Townsend ...	Little river	P.	Liq. chlorine..	Little River Lbr. Co.

Total	3
Municipal	1
Private	2
Well	0
Spring	2
Surface	1

GROUP 5

SUPPLIES EMPLOYING SEDIMENTATION AND STERILIZATION

Location	Source	Type Sterilization	Owner
Cookeville	Springs	Liq. chlorine	M.
Nashville	Cumberland river ...	Liq. chlorine	M.

Total	2
Municipal	2
Private	0
Wells	0
Springs	1
Surface	1

GROUP 6

SUPPLIES EMPLOYING IRON REMOVAL

Location	Source	Treatment	Owner
Dyersburg.	Wells..	Air lift, sedimentation, filtration.	M.
Memphis..	Wells..	Air lift, sedimentation, filtration*	M.
Paris......	Wells..	Air lift, sedimentation..........	Ky.-Tenn. Power Co.
Ridgeley...	Wells..	Aeration, gravel, filtration......	So. Utilities.
Ripley.....	Wells..	Air lift, sedimentation, filtration.	W. Tenn. P. & L. Co.

Total	5
Municipal	2
Private	3
Wells	5
Springs	0
Surface	0

---

*Liquid chlorine available for emergency use.

Table 2 shows the number of investigations made, by months, for the past two years. With increased personnel, it is possible to visit the water supplies at regular intervals. The program calls for two regular visits each year. This will probably be modified in that the majority of the water supplies in the western grand division of the state are obtained from deep wells and do not require any treatment except iron removal in some instances. It is interesting to note that where water supplies contain sufficient iron to cause taste and staining, the consumers are demanding an iron free water. This has been the means of obtaining five iron removal plants in that section of the state.

TABLE 2

INVESTIGATIONS OF PUBLIC WATER SUPPLIES

	1925	1926	1927
January		18	38
February		26	27
March		18	40
April		16	19
May		33	25
June		17	35
July	29	12	
August	15	25	
September	8	24	
October	14	24	
November	17	10	
December	12	14	
Total	95	237	184

TABLE 3

FREQUENCY OF VISITS TO PUBLIC WATER SUPPLIES

Number of Times Visited	Number of Water Supplies	
	1926	1927*
0	10	21
1	48	78
2	47	22
3	15	10
4	3	2
5	5	1
6	1	1
7	1	1

*6 months period, Jan. 1-June 30.

Table 4 and figures show the upward trend in the number of samples being submitted. It shows definitely that interest in the quality of the water is increasing. A large number of samples show contamination. This is due to the fact that a larger number of samples are being submitted and shows where improvement is necessary.

TABLE 4

TOTAL NUMBER OF SAMPLES SUBMITTED MONTHLY AND RESULTS OF EXAMINATIONS

	Total		Contaminated		Per Cent Contaminated	
	1926	1927	1926	1927	1926	1927
January	64	97	15	11	21.9	11.4
February	76	99	16	22	21.1	22.2
March	83	126	14	32	16.9	25.4
April	86	115	11	17	12.8	14.8
May	79	120	16	30	20.2	25.0
June	102	105	28	32	27.4	30.5
July	105	...	30	..	28.6	...
August	90	...	23	..	25.6	...
September	79	...	24	..	30.4	...
October	91	...	25	..	27.5	...
November	81	...	22	..	27.2	...
December	88	...	14	..	15.9	...
Total	1,024	662	238	144	275.5	129.3
Average	85.3	110.3	19.8	24	23.0	21.6

Table 5 shows the number of water supplies submitting samples. Comparing the six months period of 1927 with 1926 it will be seen that more regular monthly submission is being obtained. The frequency and regularity of samples submitted are shown in Table 6.

TABLE 5

NUMBER OF WATER SUPPLIES SUBMITTING SAMPLES, AND RESULTS OF EXAMINATION

	Total		Contaminated		Per Cent Contaminated		Per Cent of Supplies Submitting
	1926	1927	1926	1927	1926	1927	1927
January	61	80	15	9	24.2	11.2	58.8
February	70	88	16	19	22.5	21.6	64.7
March	79	107	11	26	13.8	24.3	78.7
April	79	104	10	17	12.3	16.3	75.9
May	71	102	16	26	22.2	25.5	74.4
June	81	98	24	30	29.3	30.6	71.5
July	88	...	24	..	27.3	...	...
August	74	...	22	..	29.7	...	...
September	62	...	21	..	33.3	...	...
October	76	...	19	..	25.0	...	...
November	66	...	18	..	27.3	...	...
December	78	...	13	..	16.4	...	...
Total	886	579	209	127	283.3	129.5	424.0
Average	73.8	83.2	17.4	21.2	23.6	21.6	70.7

TABLE 6

Frequency and Regularity of Samples Submitted by Public Water Supplies

No. of Samples	No. of Plants		No. of Months During Year Samples Were Received	No. of Plants	
	1926	1927*		1926	1927*
0	5	7	0	5	7
1	6	3	1	6	3
2	5	10	2	2	7
3	9	19	3	10	23
4	7	14	4	9	18
5	11	26	5	7	30
6	10	32	6	13	43
7	9	14	7	11	..
8	10	7	8	14	..
9	9	2	9	12	..
10	16	1	10	9	..
11	11	1	11	14	..
12	8	1	12	12	..
13-16	9	..	..	..	..
17-19	1	..	..	..	..
20 and over	4	..	..	..	..

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*Six months period—January 1-June 30.

ORTHOTOLIDINE TESTING SETS

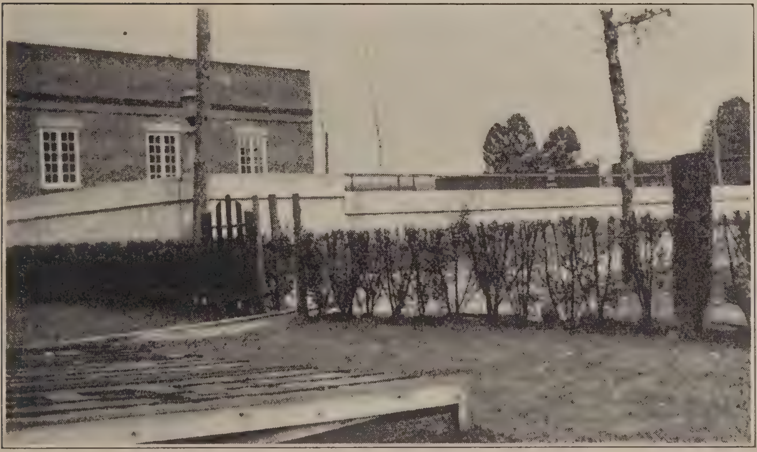
The practice of furnishing orthotolidine testing sets free of charge has been continued. The cost of the sets is nominal and the benefits derived far exceed the cost. Forty sets have been furnished during the past two years.

EMERGENCY CHLORINATORS

The two emergency chlorinators loaned to the department have been very helpful. It has been necessary to limit the time these machines may be kept at a plant to 60 days. That period of time will allow for repairing a machine or purchasing a new one.

CERTIFICATION OF RAILROAD WATER SUPPLIES

The traveling public, using such common carriers engaged in interstate traffic, is assured safe water. All supplies used in interstate traffic by these common carriers are investigated and certified by cooperative work between this division and the U. S. Public Health Service.



Types of Water Filtration Plants Being Installed in Tennessee.

WATER SUPPLY IMPROVEMENTS DURING BIENNIUM

Laboratory Equipment at Filtration Plants

Harriman—Equipment for making physical, chemical and bacteriological tests.

Gallatin—Equipment for making physical and chemical tests.

Kingsport—Equipment for making physical and chemical tests.

Ripley—Equipment for making physical and chemical tests.

Improvements to Existing Water Systems

Nashville—28,000,000 gal. filtration plant (construction soon to be started).

Alcoa—1,000,000 gal. filtration plant (completed).

South Pittsburg—1,000,000 gal. filtration plant (completed).

Knoxville—15,000,000 gal. filtration plant (under construction).

Tiptonville—250,000 gal, filtration plant (completed).

Ripley—750,000 gal. filtration plant (completed), iron removal.

Townsend—300,000 gal. filtration plant (completed), pressure filter.

Bayton—1,000,000 gal. filtration plant (construction soon to be started. New source of supply.)

McMinnville—1,000,000 gal. filtration plant (completed).

Ridgeley—Filtration plant (under construction), iron removal.

Gleason—Replacing old inadequate system with entirely new system.

Whiteville—Replacing old inadequate system with entirely new system.

Millington—Replacing old inadequate system with entirely new system.

Definite Plans for Replacing Inadequate Water Systems

Waverly
Centreville

Sterilization Begun

Lawrenceburg	Liquid chlorine
Tullahoma	Liquid chlorine (auxiliary spring supply)
Loudon	Liquid chlorine
Waverly	Liquid chlorine
Manchester	Liquid chlorine
Newport	Liquid chlorine
Dunlap	Hypochlorite
Jasper	Hypochlorite
Charleston	Hypochlorite

New Water Systems Constructed

City	*Source*	*Treatment*
Portland	Springs	Sterilization
Watertown	Wells	None
Rutherford	Wells	None
Bluff City	Spring	None
Clinton	Spring	Filtration—sterilization
Hohenwald	Spring	None
Bradford	Wells	None
Trezevant	Wells	None

Bonds Voted for New Systems

Crossville Gainesboro

New Water Systems Contemplated

Petersburg	preliminary survey made
Jonesboro	preliminary survey made
Monterey	Preliminary survey made
Savannah	Preliminary survey made
Selmer	Preliminary survey made
Gates	Preliminary survey made

SMALL WATER SUPPLIES INVESTIGATED AND PLACED UNDER SUPERVISION

City	*Sources of Supply*	*Treatment*
Grand Junction	Wells	None
Lynnville	Well and spring	None
Normal	Wells	None
Henning	Wells	None
Trimble	Wells	None
Alamo	Wells	None
Arlington	Well	None
Germantown	Wells	None
Erin	Spring	None
Butler	Spring	None
Richard City	Spring	None
Sequatchie	Springs	None
Walland	Well and river	None
Copper Hill (T. C. Co.)	Springs	None
Ducktown (T. C. Co.)	Springs	None
Townsend	River	Pressure filter and chlorination

APPROVAL OF PLANS

It has been the policy to approve final plans and specifications of new water works systems and major improvements to existing water systems. The approval is based on standard practice and experience. A future policy will provide for the submission of preliminary plans in order that any necessary changes can be made before final plans are submitted for approval.

PLANS APPROVED FOR NEW WATER SYSTEMS AND MAJOR IMPROVEMENTS TO EXISTING SYSTEMS

Trezevant	New System	Nashville	Improvements
Clinton	New System	Knoxville	Improvements
Portland	New System	Tiptonville	Improvements
Bradford	New System	Gleason	Improvements
Hohenwald	New System	So. Pittsburg	Improvements
Jonesboro	New System	Alcoa	Improvements
Petersburg	New System	Dayton	Improvements
Gainesboro	New System	Newport	Improvements
Fayetteville	Improvements	Whiteville	Improvements
Humboldt	Improvements	Lewisburg	Improvements
Ripley	Improvements	Cumberland Gap	Improvements
Brownsville	Improvements	Ridgeley	Improvements
McMinnville	Improvements		

DISTRIBUTION OF POPULATION IN TOWNS AND CITIES OF TENNESSEE

Population Group	No. of Towns in Group	Per Cent of Towns	Cumulative		Population in Group		Cumulative Totals	
			No. of Towns	Per Cent of Towns	Number	Per Cent of Total in State	No. of Population	Per Cent of Total in State
20,000 and up	5	2.7	5	2.7	493,508	59.6	493,508	59.6
20,000-10,000	1	0.5	6	3.2	14,806	1.8	510,314	61.4
10,000-6,000	7	3.8	13	7.0	54,619	6.6	562,933	68.0
6,000-4,000	14	7.6	27	14.6	67,235	8.1	630,168	76.1
4,000-3,000	13	7.1	40	21.7	42,915	5.2	673,083	81.3
3,000-2,000	18	9.8	58	31.5	46,719	5.6	719,802	86.9
2,000-1,500	13	7.1	71	38.6	22,271	2.8	742,073	89.7
1,500-1,000	27	14.7	98	53.3	32,068	3.9	774,141	93.6
1,000-750	20	10.8	118	64.1	16,651	2.0	790,790	95.6
750-500	41	22.3	159	86.4	24,434	3.0	815,226	98.6
500-400	25	13.6	184	100.0	11,127	1.4	826,353	100.0
Totals	184	100.0			826.353	100.0		

1926 Population (Estimated).

Towns not listed 1910, or showing decrease 1910-1920, assumed as of 1920 census.

Total population of state (Estimated 1926)—2,430,144.

DISTRIBUTION OF PUBLIC WATER SUPPLIES BY POPULATION GROUPS

Group	Population of towns in group having public water supplies	Per cent of total population in group living in towns having public water supplies	No. of towns having public water supplies
20,000 and up...	493,207	100	5
20,000-10,000 ...	14,806	100	1
10,000-6,000	54,619	100	7
6,000-4,000	67,235	100	14
4,000-3,000	42,915	100	13
3,000-2,000	46,719	100	18
2,000-1,500	20,623	92.6	12
1,500-1,000	27,836	86.8	23
1,000-750	8,430	50.6	10
750-500	12,509	51.2	21
500-400	4.807	43.2	11

Total population of state—2,430,144.

32.7% of total population of state living in towns having public water supplies.

PROMOTION OF NEW WATER WORKS

A necessary activity is the promotion of new water works systems. Towns are visited for the purpose of interesting city officials and civic organizations in the need of water works. The employment of a competent water works engineer is advised, to prepare preliminary plans and estimate cost. This serves as a basis for placing the proposition before the citizens. Before the bond issue election, addresses are made when requested, before civic clubs or mass meetings to explain the benefits of a water works system.

SEWERAGE

Supervision of municipal sewerage and sewage disposal was undertaken by the State Board of Health in 1919, when an engineer of the United States Public Health Service was assigned to Tennessee. This work has been continued since the creation of the Division of Sanitary Engineering in 1921.

The activities in connection with this supervision consist of: (1) Collection and study of data relative to the status of the problem; (2) promotion of the construction of new systems and improvements to existing systems; (3) check and approval of plans and specifications for new sewerage systems and sewage treatment plants; (4) field investigations of the conditions and operation of sewerage systems throughout the state, including complaints of unsatisfactory conditions; (5) advice to city officials and operators. The work is advisory and supervisory in most cases, as the city officials are expected to act under their local authority and upon their own initiative. Certain state-wide regulations have been promulgated by the State Department of Public Health, and others have been recommended for adoption by municipalities.

STATUS OF MUNICIPAL SEWERAGE

TABLE 1

Status of Sewerage As of June 30, 1927

Number of towns having sewerage systems	67
Systems completed during biennium	10
Number of towns having some sewers, but not classed as "sewered" towns	8
Estimated population having sewers available	604,300
Number of towns of 400 inhabitants or more having public water supply, but not sewered	68
Number of towns of 1,000 inhabitants or more having public water supply, but not sewered	33
Sewer systems under construction	None
Plans for municipal systems approved during biennium	10
Preliminary surveys and estimates for municipal sewerage systems during biennium	10

In Table 1 all towns of four hundred people or more having a public water supply have been considered. The population figures used are estimated for the year 1926. Items referring to systems completed, plans approved, surveys and estimates made are for the biennial period, July 1, 1925, to June 30, 1927. The estimated population having sewers available is based on the assumption that an average of eighty-five per cent of the population of the sewered towns have sewers available.

From the standpoint of promotion of new work, it is interesting to note that of all towns and cities in the state having public water supplies, almost exactly half do not have sewerage systems, and that there are 33 towns with a population of over 1,000 having public water supplies but not complete sewerage.

The towns having some sewers but not classed as sewered towns are Lafollette, Knoxville, McMinnville, Etowah, Gallatin, South Pittsburg, Cowan and Springfield. Several of these towns have privately owned sewer lines which are connected to fifteen or perhaps twenty per cent of the homes, while others have short sewer lines built by the city to serve some particular section.

The status of the treatment of sewage in the state is shown in Table 2 below. This table shows that sewage treatment in the state is in its preliminary stages, since 83.2 per cent of all the sewage is dumped directly into the streams; 11.2 per cent receives sedimentation only, in septic tanks or some other plain settling compartments; and only 5.6 per cent of the sewage undergoes secondary treatment.

TABLE 2

Classification of Municipal Sewerage Systems As to Method of Treatment

Treatment Process Employed	No. of Towns Employing	Per Cent of Sewered Towns	Population of Towns Employing	Per Cent of Population of all Sewered Towns
Dilution only	31	46.2	592,102	83.2
Sedimentation	28	41.7	79,385	11.2
Sedimentation plus secondary treatment.	8	12.1	40,080	5.6
Total	67	100.0	711,567	100.0

In Tables 3 and 4 the population figures given are only approximate since they are based on an estimated population for the year 1926. In Table 3 the method of treatment employed by the various towns and cities is indicated by an initial, the towns being divided into three classes: those using dilution or dumping sewage directly into a stream; those using sedimentation only, which in most cases means a septic tank; and those using sedimentation plus some form of secondary treatment.

TABLE 3

LIST OF TOWNS HAVING SEWERAGE SYSTEMS

Town	Est. Population 1926	Treatment Process
Memphis	181,099	D.
Nashville	123,129	D.
Knoxville	102,701	D.
Chattanooga	65,870	D.
Jackson	20,709	D.
Johnson City	14,806	D.
Bristol	8,586	D.
Clarksville	8,110	D.
Kingsport	8,000	D.
Old Hickory	8,000	C.
Dyersburg	7,821	D.
Cleveland	7,106	C.
Morristown	6,996	C.
Murfreesboro	5,780	S.
Columbia	5,526	D.
Rockwood	5,247	S.
Paris	5,239	S.
Greeneville	4,888	C.
St. Elmo	4,768	C.
Lenoir City	4,701	S.
Harriman	4,594	D.
Maryville	4,554	S.
Union City	4,426	S.
Lebanon	4,339	C.
Humboldt	4,193	D.
Erwin	4,055	D.
Fayetteville	3,743	S.
Tullahoma	3,737	S.
Covington	3,662	S.
Alcoa	3,358	C.
Franklin	3,242	S.
Lewisburg	3,240	D.
Newport	3,203	D.
Martin	3,202	S.
Alton Park	3,020	S.
Trenton	2,960	D.
Shelbyville	2,938	D.
Elizabethton	2,912	D.
Pulaski	2,780	S.
Athens	2,770	D.
Cookeville	2,723	S.
Winchester	2,714	S.
Dickson	2,511	S.
Milan	2,328	S.
North Chattanooga	2,196	D.
Ripley	2,105	S.
Sweetwater	2,045	S.
Lexington	1,969	D.
Jellico	1,888	D.
McKenzie	1,815	D.
South Fulton	1,805	S.
Halls	1,711	S.
Dayton	1,701	S.

TABLE 3 (Continued)

Town	Est. Population 1926	Treatment Process
Clinton	1,600	D.
Rogersville	1,498	D.
Dyer	1,300	S.
Henderson	1,237	S.
Tiptonville	1,174	D.
Ridgeley	1,145	D.
Somerville	1,106	D.
Copperhill	1,102	D.
Oneida	943	S.
Bemis	675	D.
Monteagle	625	C.
Cumberland Gap	525	D.
Kingston	516	S.
Sewanee	400	S.

D.—Dilution. S.—Sedimentation.
C.—Sedimentation and secondary treatment.

TABLE 4

LIST OF TOWNS HAVING PUBLIC WATER SUPPLIES, BUT NO SEWERAGE SYSTEMS

Towns	Est. Population 1926	Towns	Est. Population 1926
Springfield	4,925	Centerville	882
Lafollette	3,200	Erin	855
Brownsville	3,170	Madisonville	850
McMinnville	3,123	Decherd	815
Etowah	3,015	Rutherford	808
Gallatin	2,972	Kenton	804
Lawrenceburg	2,925	Mountain City	803
Tracy City	2,669	Whiteville	754
South Pittsburg	2,506	Hohenwald	742
Moscow	2,500	Jasper	128
Mt. Pleasant	2,165	Alamo	720
Newbern	1,866	Millington	719
Monterey	1,648	Jacksboro	638
Dunlap	1,644	Cowan	636
Sparta	1,572	Lookout Mountain	623
Oakdale	1,552	Butler	625
Bruceton	1,500	Trezevant	587
Greenfield	1,474	Lynnville	552
Jefferson City	1,466	Mosheim	525
Obion	1,426	Bluff City	524
Englewood	1,271	Orine	522
Coal Creek	1,265	Orlinda	510
Tellico Plains	1,220	Bradford	507
Manchester	1,205	Sharon	506
Dresden	1,186	Arlington	504
Watertown	1,183	Grand Junction	501
Huntingdon	1,126	Henning	495
Waverly	1,054	Pikeville	488
Collierville	1,101	Charleston	480
Portland	1,043	Niota	467
Bolivar	1,031	Signal Mountain	441
Bells	1,020	Tazewell	424
Spring City	1,001	Gleason	412
Trimble	916	Hillsboro	400

PROMOTIONAL WORK DURING THE DIENNIUM

Promotional work is recognized as a particular problem at the present time and has been actively pushed. This is done by paying occasional visits to the city officials of towns which do not have sewerage and conferring with them in an attempt to interest them in undertaking sewerage improvement. If a preliminary survey and estimate is being considered, the various members of the city council are seen and the advantages of sewerage explained to them. Whenever a bond election for sewers is to be held, engineers of this division are available to help the city officials promote the bond issue by speaking before city clubs, mass meetings, etc., by preparing literature for distribution from house to house and helping in any other way possible to create interest in the proposal.

Engineers have been employed and preliminary surveys and estimates made for the towns of Greenfield, Sparta, Monterey, Brownsville, Jonesboro, Etowah, Bolivar, Dresden, South Pittsburg and Crossville. The following towns have completed the construction of sewerage systems for the entire town: Dayton, Winchester, Kingston, Cookeville, Oneida, Clinton, Murfreesboro, North Chattanooga and South Fulton.

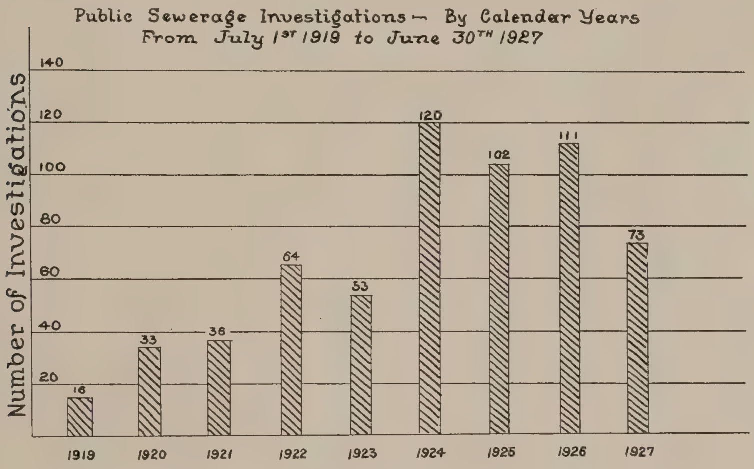
APPROVAL OF PLANS

During the biennium plans and specifications for sewerage improvements have been submitted, checked and approved for the following towns: Winchester, Kingston, McMinnville, Dickson, Murfreesboro, Cookeville, North Chattanooga, Oneida, Jonesboro and South Fulton.

An attempt has been made to standardize and more definitely state the requirements of the division for submission of plans; and to formulate a more definite policy as to what will be approved, including details of construction of the sewer system, and the method of disposal to be employed. In most cases, a personal conference is obtained between the engineer of the division and the consulting engineer employed by the city for the design and supervision of construction. Both city and consulting engineers have been very cooperative in this matter and the suggestions made as a rule are accepted without question.

FIELD INVESTIGATIONS AND REPORTS

An effort has been made to reach all cities in the state at least twice each year and in other cases as often as is necessary when trouble was encountered, such as complaints of nuisances or difficulties in the operation of the sewage treatment plant or other works.



It should be noted that the figures given for the years 1925 and 1926 are for investigations or visits pertaining to municipal sewerage alone. In 1926 for example, 111 visits were made relative to municipal sewerage, and thirty-one additional visits were regarding school and institutional sewage disposal. When necessary the engineer making a visit writes a report with detailed recommendations covering this visit, copies of which are transmitted to the interested city officials.

PRIVATE SEWAGE DISPOSAL

In addition to the work with towns and cities, engineers of this division make visits and give advice relative to disposal of sewage from private institutions, schools, camps, etc. This work is done usually upon request, because it is not possible to cover all such conditions throughout the entire state in a routine manner.

Advice is given upon request to city and county health officials relative to private sewage disposal such as sanitary privies, individual septic tanks, and programs for promoting connection to the city sewerage system. In cooperation with the Division of Local Organization and the State Department of Education, plans and drawings have been prepared covering rural private sewage disposal, school sanitation, etc. During the last six months of the biennium the problem of school sanitation has been assigned to one engineer who devotes his full time to this activity.

SEWERAGE OF STATE INSTITUTIONS

Since its inception, the Division of Sanitary Engineering has been particularly charged with rendering advice to the State Department of Institutions relative to sanitation of all state institutions. In some cases, engineers of this division have made field surveys, prepared plans and actually supervised the construction of sewerage improvements. When a question of sewerage arises, the Commissioner of Institutions is free to call upon the engineers of the division for a preliminary survey and advice as to how he should proceed.

STREAM SANITATION

Since October, 1926, a sanitary engineer has been assigned to work specifically on sewage disposal and stream sanitation.

The first director of the Division of Sanitary Engineering was interested in and realized the importance of maintaining the streams of the state in such condition so as not to interfere with their more important uses, particularly for public water supplies. On one occasion he made an effort to obtain a special appropriation for making a study of several of the streams from the standpoint of sewage and industrial pollution. Failing in this, the division has been forced to limit activities in this field to educational work, supervision of municipal sewage disposal and the writing of advisory reports on those industrial plants which have created sufficient nuisances to cause vigorous complaint.

A start is now being made in the direction of control of stream pollution and this is classed as a major activity. Marked industrial development all over the state and particularly in the eastern section makes it evident that the problem of preserving streams in satisfactory condition is becoming rapidly more complicated. Experience in other states has shown rather conclusively that prevention of acute pollution is far easier than correction of bad conditions after they have developed. The State Department of Public Health is the agency most vitally interested in protecting the streams, because the most dangerous and damaging effect of stream pollution is in rendering streams unfit for public water supplies. At present an attempt is being made to collect data, establish contacts and otherwise lay the ground work for a progressive stream sanitation program.

On January 25, 1927, upon invitation, the Tennessee State Department of Public Health became a signatory to the Interstate Stream Conservation Agreement. This agreement which affects practically the entire valley of the Ohio river and its tributaries, specifies that the departments of health of the signatory states agree to cooperate in carrying out policies for the conservation of the interstate streams, particularly the correction and prevention of undue pollution. This will be done in order that the streams may be used for maximum benefit to all the people of the state or states concerned. The chief sanitary engineers of the signatory departments of health comprise a board whose duty it is to set up policies and standards and work out the details of procedure for carrying out this work. Tennessee was represented at the first meeting of the board at Columbus, Ohio, April 29 and 30, 1927. Most of the states entering the agreement have been active in stream sanitation work for several years and cooperation with these states which will include exchange of ideas, research data, methods of procedure, outlines of legislation, etc., will be of inestimable value to Tennessee in starting work along the same lines.

The first work done was the preparation of an outline of objectives and proposed procedure for work during the year 1927. In the following paragraphs a brief resume of the work done so far will be given.

Data now being collected will be plotted on a stream pollution map. This map will be prepared in accordance with plans worked out by a committee of the Interstate Agreement and when complete will show all of the important sources of industrial and sewage pollution of the streams in the state. At the same time tables of data are being prepared for convenient use and inclusion in reports.

SPECIAL PROBLEMS

The waste from a large woolen mill containing lint, soap and grease has interfered with the operation of the local municipal sewage treatment plant. Dye wastes from this mill and from several other mills located in the town have caused complaint, due to discoloration of the small creek into which sewage of the town is discharged. Experimental work for the purpose of determining suitable methods of treatment for these wastes is being carried on in cooperation with the officials of the woolen mill in question.

At Knoxville, trouble from tastes and odors in the river water has been experienced. It is known that a number of industrial plants located at points on the Holston river discharge waste into the river. Industrial pollution also finds its way into the Pigeon river which empties into the French Broad river above the Knoxville water plant. Investigations to determine the source of these troublesome tastes and odors are now in progress.

The state of North Carolina has agreed to cooperate with Tennessee in improving conditions on the Pigeon river. The Pigeon is an interstate stream which receives industrial waste from plants located in North Carolina and from others located in Tennessee.

Little River in the Smoky Mountain Park area is used for water supply and recreational purposes. It is subject to pollution by sewage from several camps and villages, and waste from a tannery and a large lumber mill. An attempt is being made to obtain necessary treatment of sewage and industrial waste and this work is to be pushed more energetically during the year 1928.

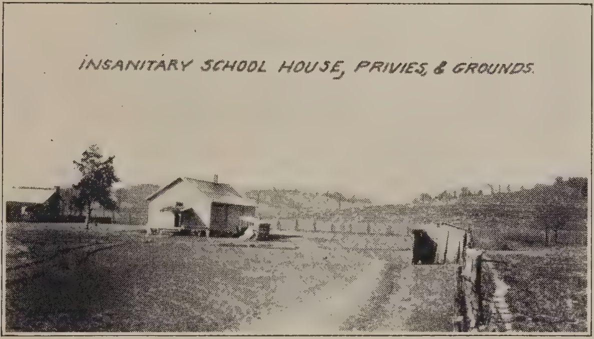
A number of minor complaints have been received that small streams receiving sewage and waste from industrial plants cause nuisances and are unfit for use in watering stock and for other purposes. In practically all cases an investigation has been made and recommendations furnished for whatever improvement might be effective in these streams.

In connection with a preliminary investigation for the design of a new filtration plant for the city of Kingsport, Tennessee, a rather thorough investigation was made covering all points of pollution on the south fork of the Holston river. Samples of water for bacteriological and chemical analysis were collected from the streams at a number of strategic points.

SCHOOL SANITATION

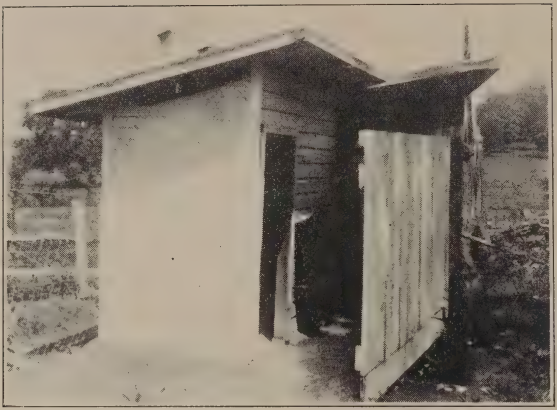
Prior to December 1, 1926, there was no state-wide program for school sanitation. This was handled as work of an emergency nature when it was requested by the superintendent of schools, a building committee or county health officer.

Beginning December 1, 1926, the International Health Board of the Rockefeller Foundation furnished the salary of a full-time engineer to work in cooperation with the State Department of Education on school sanitation and the work was actually started January 1, 1927. The first six months of the year were spent in studying the problems, evolving a plan of procedure, and starting a sanitation program in several counties.


INSANITARY SCHOOL HOUSE, PRIVIES, & GROUNDS.

The plan, as finally adopted, is to visit the county superintendent personally, determine the status of sanitation in the county, explain the policy and the necessity of the program, and determine which type or types of sanitary equipment are necessary. Before the work is started the engineer spends sufficient time going over the schools with the superintendent explaining what is to be done and the most practical solution of the problems. In counties having full-time county health departments or sanitary officers, the work is initiated and then turned over to their supervision. Periodic visits are being made to the counties for the promotion of this work.

Sanitation is insured in all state-aid schools through a requirement whereby certain sanitary features must be included before financial aid on construction will be given. Drawings of sanitary devices have been prepared to guide the local authorities

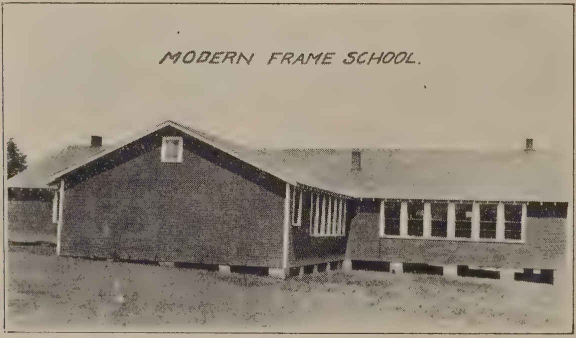


Approved Type of School Privy.

in construction and these are to be included in a bulletin dealing with the installation of sanitary facilities.

Questionnaires were sent to each of the 95 county superintendents of schools requesting information concerning toilets, water supplies, and the construction of new school buildings. Replies disclosed the fact that sanitary conditions in general in the rural schools are very poor.

The following counties have had a school sanitation program under supervision of the local health departments: Shelby, Obion, Weakley, Gibson, Montgomery, Hamilton, Rhea and Roane. Sanitation programs were started in the following counties: Polk, Bradley, Anderson, Williamson, and Rutherford.



MODERN FRAME SCHOOL.

MALARIA CONTROL (Anopheles mosquito)

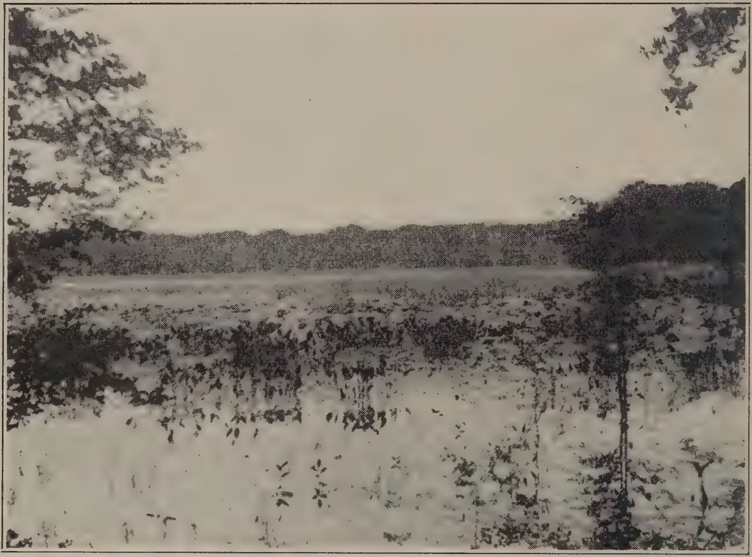
The malaria control problems in Tennessee lie principally in the western part of the state between the Tennessee and Mississippi rivers, an area of some 100 miles square. Five counties in West Tennessee did county malaria control work in 1927, namely: Shelby, Obion, Lake, Dyer and Lauderdale. Control in the latter three counties was made more difficult by the flooding of large areas of land by the backwater from the Mississippi river.

Surveys were made of the flooded counties, including all of the towns therein, and recommendation made for malaria control. The National Red Cross supplied one tank car and 131 barrels of oil for use in flooded counties. The distribution of the oil and general malaria control was under the direct supervision of the local county health departments. Intensive quinine prophylaxis was used in these counties.

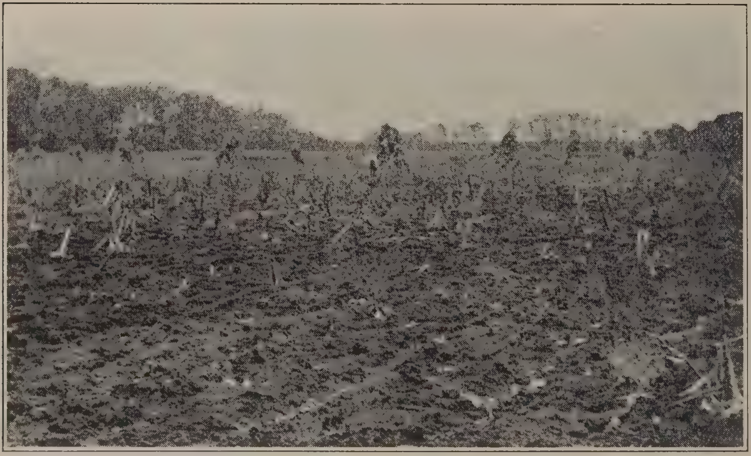
The National Red Cross provided approximately $5,300 for the screening of homes in the flooded area of Tennessee. A screen door factory under the supervision of the U. S. Public Health Service was established at Dyersburg and 1,400 screen doors were made by the local high school class in vocational training. The doors were hung and the windows were screened under the supervision of the local county health departments. A total of 956 homes were screened.

Shelby county continued the control work begun in 1923. During 1927 the work was extended over 130 square miles of territory largely around the city of Memphis. Fifty thousand gallons of oil were used, all of which was waste oil from filling stations. Twenty-five pounds of Paris green mixed with 100 parts of dust were used for mosquito control in the river bottoms. For mosquito (culex) control, ten barrels of larvacide were used, one gallon being added to fifty gallons of oil. Private individuals spent about $5,000 on ditching. The county also dug a mile of ditches. In 1924-25 the county stocked 1,500 ponds with Gambusia affinis. The ponds were observed in 1927 and the minnows were present in large numbers where there were no large fish.

Malaria control work in Obion county was conducted along Reelfoot Lake and consisted of educational work stressing the advisability of screening and prophylaxis.



Lake at Cowan Before Drainage



Basin of Lake Shown Above Converted into a Cornfield.

The following cities and towns in Tennessee did mosquito control work during 1927: Memphis, Covington, Ripley, Halls, Gates, Dyersburg, Union City, Franklin, Tiptonville, Ridgeley, Martin, Trenton, Humboldt, Milan, Cookeville, Brownsville, Dresden, Jackson, Cowan, Murfreesboro, and Chattanooga, as well as many smaller communities. The Division of Sanitary Engineering made original surveys for control in these cities and reinspection in the majority of them.

A lake, fifty acres in extent, adjacent to the town of Cowan, Tennessee, had been a prolific source of Anopheles quadramaculatus. The division was instrumental in securing the drainage of the lake. The preceding pictures show the area before and after drainage.

Steps were taken to control Anopheles mosquito breeding in the impounded water of Falling Water river, Cookeville, Tennessee. The principal measures instituted were: clearing the lake of debris, removing aquatic growth, regular oiling and the installation of flash boards to raise and lower the water level. Malaria in this vicinity was reduced sixty per cent the following year.

CONSULTING SERVICE TO CITY AND COUNTY HEALTH DEPARTMENTS AND TO OTHER DIVISIONS OF THE STATE HEALTH DEPARTMENT

The several full-time county health departments and sanitary officer plan counties frequently have sanitary engineering problems. This also applies less frequently to part-time health officers.

Sanitary engineering surveys have been made for the cities of Knoxville, Chattanooga and Nashville, as well as many of the smaller cities in the state. The survey at Knoxville was for the correlation of field data obtained by inspectors so that it could be properly tabulated in the office and placed in legend form on maps thereby making the information readily available. At Chattanooga a survey was made of Chattanooga creek for nuisance, stream pollution, sewerage and sanitation; of North Chattanooga and East Chattanooga for sewerage; and of annexed territory for malaria control and for milk and water supply. Chattanooga proper was also surveyed for malaria control.

Complete sanitary surveys were made at Nashville covering water, sewerage, general sanitation, milk, housing, food establishments, mosquito control, and barber shops. Surveys of the smaller cities included all or some of the above mentioned items, as well as additional items of sanitation.

Service to other divisions of the State Department of Public Health has been the preparing of maps, charts, graphs, and consultant service in sanitary engineering matters. Cooperation has been extended to the Division of Epidemiology by making surveys related to epidemics of typhoid fever and dysentery.

SWIMMING POOL SANITATION

Every large city now has several swimming pools and many of the smaller cities have at least one pool. Some of the pools are municipally owned, but the majority are owned by individuals and corporations. The division prepared pool regulations covering both design and operation. Swimming pool supervision is now left largely to the local health authorities, the division acting only in an advisory capacity.

MILK SANITATION

Milk is perhaps the one most important item of diet, and yet is the one most liable to contamination. For these reasons the division is going to make milk sanitation a major activity.

Early in 1926 the Tennessee State Department of Public Health adopted the United States Public Health Service Standard Milk Ordinance as the standard for the state. With assistance from the Service, milk surveys were made of the following cities and towns: Bristol, Chattanooga, Clarksville, Dyersburg, Greenville, Jackson, Johnson City, Kingsport, Knoxville, Memphis, Morristown, Murfreesboro, and Nashville.

Chattanooga, Knoxville, Kingsport, Murfreesboro, and Dyersburg have passed the standard ordinance. Improvements have varied, in some instances reaching as high as 87 per cent. Under the cooperative program, each city passing the ordinance appoints a local inspector who becomes responsible for the enforcement of the ordinance. This inspector is systematically trained by the division in the provisions of the ordinance. Periodic visits are made to the city. Special assistance is given during the grading period and this also serves as a check on the work of the local inspector. In counties having whole-time health departments, the sanitary officer serves as milk inspector for the smaller cities.

ROADSIDE WATER SUPPLIES

Very little work has been done in roadside water supplies. It is a distinct health problem and an important one, particularly here in Tennessee where the good roads lead across the state in every direction. Several of these highways are transcontinental highways and traffic is very heavy. The division plans to proceed with this work as soon as additional trained personnel can be obtained.

EDUCATIONAL MATERIAL

The division has prepared the following:

Bulletins—

- Earth Pit Privy
- Concrete Vault Privy
- Tennessee Type Improved Privy
- Concrete Slab Pit Privy

Forms—

- Water supply forms for plant data.
- Water analysis forms.
- Monthly report sheets for complete operation of water plants.
  - a. Filtration.
  - b. Where chlorination only is employed.
- Milk survey forms adapted from U. S. Public Health Service.
- Designs for septic tank and other methods of sewage disposal.
- Designs for two types of drinking fountains for schools.
- Many maps, prints, and charts for other divisions.

Pamphlets—

- Mimeographed letter showing how to improve a private water supply.
- Instructions for disinfecting school water supplies.
- State law licensing engineers.

REGULATIONS

Regulations on the submission of plans for new water works, new sewerage systems, and new swimming pools and their operation, were prepared soon after the establishment of the division. With the progress made in sanitary engineering since that time, parts of these regulations had become obsolete and the need of additional regulations was evident. Accordingly, new regulations were prepared, with the aid of the United States Public Health Service on the following subjects:

Governing the installation, extension and operation of public water supplies.

Governing the sanitation of watersheds of a public water supply.

Governing cross connections, auxiliary intakes and by-passes between potable public water supplies and supplies from other sources.

Governing control of quasi-public water supplies.

Governing the installation, extension and operation of public sewerage systems.

Governing the disposal of industrial waste.

Governing the pollution of streams and the control thereof.

Governing the disposal of human excreta, both solid and liquid.

Governing the impounding of water and the prevention of malaria.

Governing control over production of disease-carrying mosquitoes.

Governing the control of public bathing places.

Governing the sanitation of labor and industrial camps.

Governing the sanitation of public camps and picnic grounds.

Governing the production, handling, distribution and sale of milk and certain milk products. (Standard Milk Ordinance.)

Governing the handling and sale of shellfish.

Governing the disposal of animals dead of disease.

Use of common drinking cup forbidden.

Obstruction of health officers.

Enforcement.

Penalty for violation.

Repeal of conflicting regulations.

Validation and indorsement of regulations.

DIVISION OF CHILD HYGIENE AND PUBLIC HEALTH NURSING[*]

CHILD HYGIENE

Problem

Mother—About 400 women die each year from causes associated with childbirth. The following are the major causes of maternal mortality in the Registration Area of the United States:

Puerperal septicemia (or childbed fever)	37.5%
Other accidents and complications of labor	11.9%
Albuminuria and convulsions	26 %
Puerperal hemorrhage	9.6%
Phlegmasia alba dolens (milk leg)	4.4%
Diseases of the breast	1 %

Our maternal death rate from the above causes is high in comparison with that of other civilized countries. These deaths are to a large extent avoidable.

Infant—The chief causes of infant deaths (under one year of age) in the Registration Area of the United States are as follows:

Congenital and early infantile conditions	38.7%
Gastric (stomach) and intestinal (bowel) diseases	19.2%
Respiratory (lung diseases)	12.8%
Contagious diseases	8.5%
All other causes	20.8%

In Tennessee each year about 4,000 infants die before reaching one year of age. By the thorough application of preventive measures now known, this number could be reduced fifty per cent.

Preschool—Out of a group of 2,159 children of preschool age examined during 1925 and defects analyzed, 47.3% were found to have defects requiring the attention of a physician. It is also during this period of life that communicable diseases exact the greatest toll. This is the age during which preventive measures are most effective.

School Child—The latest available data show that approximately 75% of students in public schools throughout the United

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[*] Two distinct but related services are under the control of this division: child hygiene (including mother and child) and public health nursing. Each is treated separately.

States have physical defects which are partially or completely remediable. Out of a group of 17,372 pupils in the public schools of Tennessee examined during 1925, 68.3% were found with one or more remediable defects. Taking the above figures as a basis of calculation, approximately 421,547 students in the public schools of this state are more or less handicapped by remediable defects. The retarding influence of these defects on physical and mental development has been clearly demonstrated.

It is the problem as well as the function of the division to study the health needs of mother and child and to institute measures which will promote health and prevent illness and premature death.

PROGRAM OF WORK

In areas having organized local health work the division has rendered consultant service to local health agencies. In areas without organized local health work, the service is direct and consists of periodic visits by the central staff of physicians and nurses. Services of the following types have been rendered:

Consultant service on all questions relating to hygiene of mother and child.

Conferences with mothers and physical examination of infants and preschool children.

Demonstrations in conducting physical examinations of school children.

Organization of permanent child health centers.

Instruction of midwives in classes.

Assistance in immunization against typhoid fever, smallpox and diphtheria as a part of infant and preschool work.

Analysis of records from reports of field workers.

Distribution of silver nitrate solution to all practicing physicians and midwives in the state for prevention of blindness in the newborn.

Preparation and distribution of literature on maternal and infant welfare.

Special studies on various subjects related to maternal and infant welfare.

Distribution of prenatal letters to expectant mothers.

Preparation of health posters and other exhibit material.

Supervision of May Day and Child Health Day programs.

Special tabulation service in the Division of Vital Statistics.

SUMMARY OF SERVICE

Consultation—The staff has devoted a large portion of time to consultation with various persons and health organizations relative to questions of maternal and child hygiene. The complete report of child hygiene activities of the local health organizations towards which the state contributes financial aid will be found in the report of the Division of Local Organization.

Educational—

Total number of lectures	696
Before physicians	29
Before nurses	8
Before lay groups	653
By radio	6
Pieces of literature distributed	44,820
Sets of prenatal letters distributed	881

Literature Prepared—

Diet lists for infants.

Prenatal letters (sets of nine).

Record forms for well-baby conferences.

Prenatal case cards for nurses.

Infant and preschool case cards, for nurses.

Midwifery instruction.

Plan and scope of work for public health nurses (including standing orders).

Plan of organization of well-baby conferences.

Special Study—A statistical study was made and a paper prepared on "The Rural Physician Problem in Tennessee," which shows a steady drift of population, wealth and physicians to the larger cities. This investigation shows an unequal distribution but not a shortage of physicians.

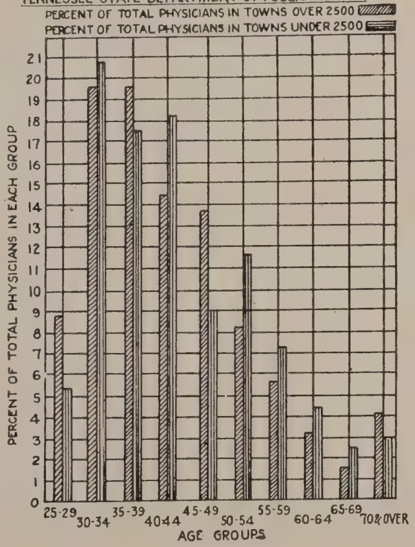
New Exhibit Material Prepared—

Baby Tray
Kiddy Koop
Layette
Posters
Baby Bath
Chase Doll
Midwifery Bag (equipped)
Hospital Exhibit
Farm Buildings with Proper Drainage
Sickbed with Equipment

DISTRIBUTION, BY AGE GROUPS, OF PHYSICIANS IN TENNESSEE TOWNS OF OVER AND UNDER 2500 POPULATION

—1906—

TENNESSEE STATE DEPARTMENT OF PUBLIC HEALTH



RELATIVE NUMBER OF POPULATION, CITY AND COUNTRY TO MEMBERS OF TENNESSEE MEDICAL ASSOCIATION 1906 AND 1925

TOTAL NUMBER PHYSICIANS	NUMBER PHYSICIANS 6 LARGER CITIES	NUMBER OUTSIDE 6 LARGER CITIES	POPULATION 6 LARGER CITIES	POPULATION RURAL	NO. POP. TO 1 PHYSICIAN CITY	NO. POP. TO 1 PHYSICIAN RURAL
—1906—						
1,225	391 or 38%	834 or 68%	314,071	1,805,048	803	2,164
—1925—						
1,456	749 or 52%	707 or 48%	507,079	1,907,689	671	2,698

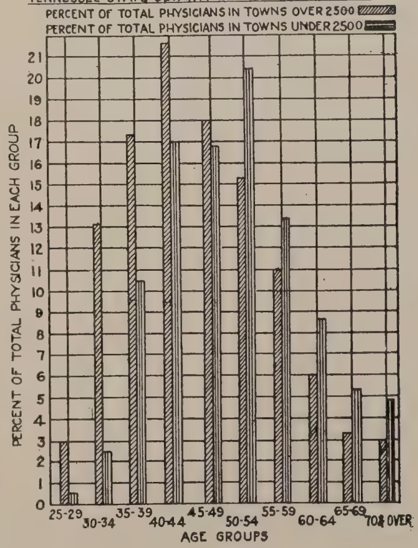
DEDUCTIONS FROM ANALYSIS OF STATUS OF MEDICAL ORGANIZATIONS FOR A PERIOD OF 20 YEARS 1906 TO 1925

Number of counties having local medical organizations - 1906	63
Number of counties having local medical organizations - 1925	65
Number of Physicians practising where they were in 1906	314 or 22%
Increase in number of members	231 or 18%
Increase in city members	358 or 20%
Decrease in rural members	127 or 20%
Increase in population - city	193,008 or 61%
Increase in population - rural	102,641 or 5%
Decrease in population to one Physician - city	132 or 19%
Increase in population to one Physician - rural	534 or 20%

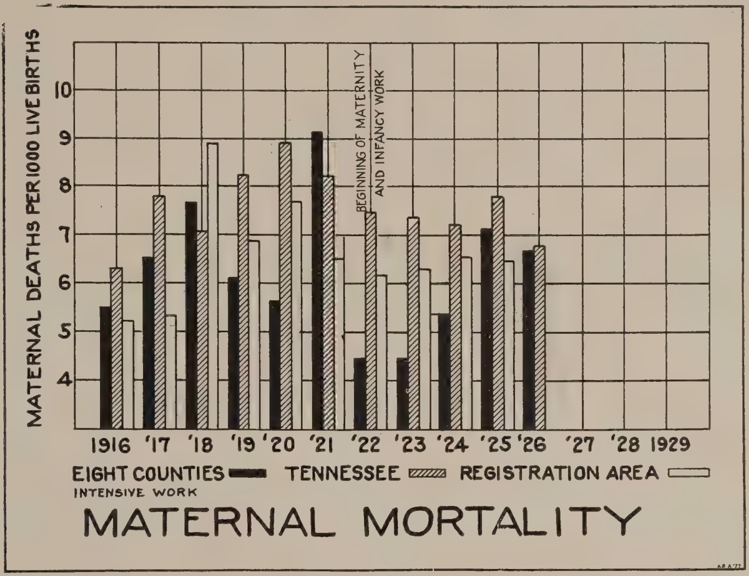
DISTRIBUTION BY AGE GROUPS, OF PHYSICIANS IN TENNESSEE TOWNS OF OVER AND UNDER 2500 POPULATION

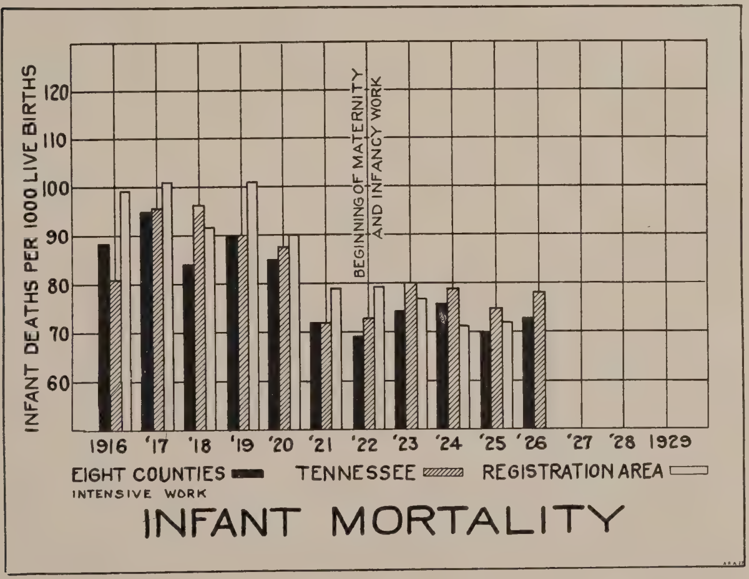
—1925—

TENNESSEE STATE DEPARTMENT OF PUBLIC HEALTH



Graphic Presentations—Charts, maps and slides have been prepared for distribution, in which various aspects of maternal and child hygiene were presented. The following are examples:





Group Demonstrations—Three hundred and seven group demonstrations have been conducted, during which simple procedures connected with proper care of mother and child were taught.

Well-Baby Conferences—These conferences have been held by staff physicians and nurse assisting. In the physical examination of supposedly well babies, all defects are recorded and the parents and family physicians are notified by letter of the character of these defects.

Infant and Preschool Conference.

Number of conferences held	732
Number of infants and preschool children examined	5,762
Number of defects found	2,396
Number of defects known to have been corrected	515

It is presumed that many defects have been corrected of which we have no record. This is true especially in counties in which there is no nursing service and therefore no means of following-up.

School Examinations—Examinations of school children have been done at the request of the county health officer in counties having no county health unit, for the purpose of demonstrating the method of examination, and stressing the importance of correction of physical defects. Nine thousand two hundred eighty-two school children were examined; 5,267 had one or more defects; and 12,264 defects were found, or an average of 1.3 defects to each child examined.

May Day—Once each year a certain day in May designated as Child Health Day is observed throughout the nation as well as the state. On this day special programs are arranged which emphasize child health.

Instruction of Midwives—In 1926, midwives attended 5,946, or approximately 10 per cent of all births in the state. There is no law regulating midwifery except one which requires that a solution of nitrate of silver be dropped in the eyes of the newborn baby for the prevention of blindness, and the law which requires that a certificate of birth be properly completed and filed with the local registrar of vital statistics; hence the aim of the division has been to improve the practice of midwifery and render it less meddlesome. A short course consisting of ten lessons has been prepared which covers the fundamentals of cleanliness, simple technique, and when to send for the doctor. One hundred and

A Typical Midwife Club.

twenty-three classes have been organized and 1,322 midwives have completed the course. Many midwives who were grossly unfit by reason of ignorance, age and infirmity failed to qualify and no longer engage in the practice.

Midwifery clubs have been organized in all counties in which classes are conducted. The clubs meet regularly for instruction and at these meetings, nitrate of silver solution and blank forms for birth certificates are distributed. The Supervisor of Midwives visits these clubs as often as possible and arranges for further instruction.

While it is impossible to appraise the results of this work, it is obvious that some progress has been made. The midwives present a more cleanly appearance; they seem to realize that their practice is being closely watched and consequently are more careful. No certificates of attendance are issued because it is thought that this might lead them to conclude that they had been licensed to practice.

PUBLIC HEALTH NURSING

Nursing service has become an essential part of many public health activities, especially of the hygiene of mother and child and the control of all communicable diseases, including tuberculosis. The public health nurse is the long arm of the service by which it reaches out and makes contacts with the people in their homes and she otherwise assists physicians in executing well-known measures for preventing disease.

SUPERVISING NURSE

The state Supervising Nurse working under the directors of the several divisions of the State Department of Public Health exercises the following functions:

Establishes standards of technique and practice.
Determines fitness of applicants for appointment.
Acts as a finding agency for local health organizations.
Renders consultant service to local health organizations.

The major part of the time of the Supervising Nurse is spent in the field, working in cooperation with local health organizations.

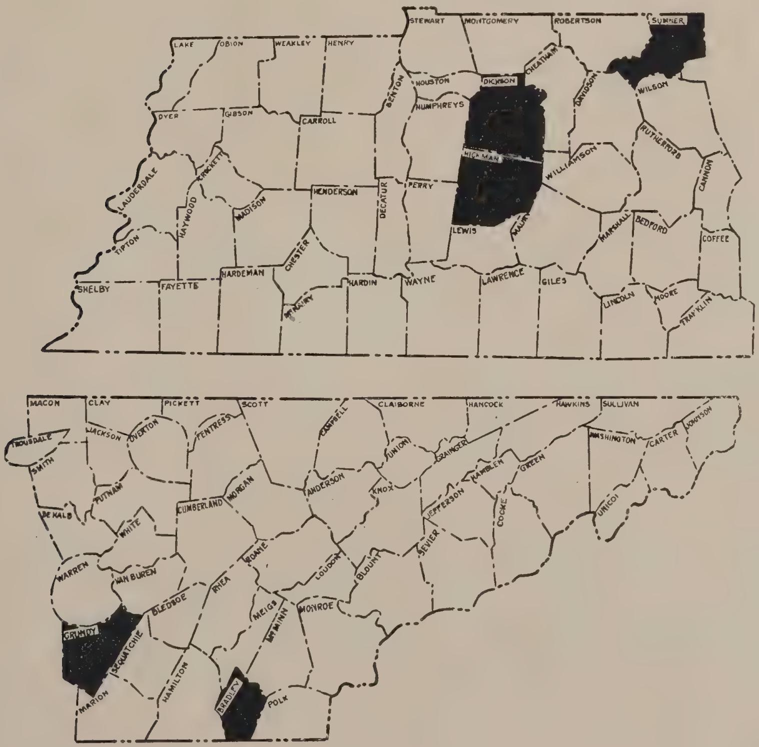
STAFF NURSES

Throughout the period, an average of three nurses have been engaged in child hygiene work. They assisted at clinics, conducted conferences, demonstrations and health classes of various types. The report of such services appears in the Child Hygiene section.

COUNTY NURSES

Five counties have had public health nurses working alone under the direction of the local county board of health and supervised by the Division of Child Hygiene and Public Health Nursing. In one of these counties, in which no public health work had been done before, a strong sentiment for health work has culminated in the organization of a full-time county health unit. Financial aid on a fifty-fifty basis is extended to any county in the state

COUNTIES HAVING HAD NURSING SERVICE ONLY



when it is agreed between the State Department of Public Health and local officials and physicians that this is the type of service best suited to the public health needs of the county.

COUNTY HEALTH DEPARTMENT NURSES

From one to several public health nurses are employed in each county health department. They work under the direction of the county health officer. The Supervising Nurse periodically visits these departments for the purpose of rendering consultant service. The report of activities by county health department nurses will be found in the consolidated report of the Division of Local Organization. The state contributes approximately one-half of the salary of county health department nurses and of this amount fifty per cent is contributed from the budget for child hygiene and public health nursing.

A Simple Home-Made Kiddie-Koop.

Rural School Children Being Trained in the Use of the Toothbrush

Each Child Uses an Individual Drinking Cup.

SUMMARY OF NURSING SERVICE

The following table is a consolidated summary of major nursing services towards which the state contributed financially:

Total number of visits, all purposes	25,834
Total number of visits, prenatal cases	4,083
Total number of visits, obstetrical cases	379
Total number of visits, postnatal cases	2,543
Total number of visits, infants (feeding cases)	12,835
Total number of visits, preschool children	5,994

Group conferences are held by nurses, in places where no physician can be present, for the purpose of weighing and measuring children and instructing parents in the fundamentals of child hygiene. 14,888 babies under one year of age and 12,241 children of preschool age were reached; and 5,478 expectant mothers were instructed.

Nurses have assisted full-time county physicians in the examination of 56,518 school children. Of this number, 16,245 were found defective; 63,784 defects found; and 9,400 defects corrected. After the school examinations the nurse follows up the children in their homes and is instrumental in having defects corrected.

Under the instruction of the attending physicians, 1,763 visits have been made to cases of tuberculosis for the purpose of caring for the patient, protecting attendants and others, and teaching bedside nursing.

There were 124 classes organized for the purpose of teaching mothercraft, in which there was an enrollment of 950.

First-aid emergency classes were organized in rural districts where there are few physicians. Instruction was given in simple remedies to be used for fainting, burns, convulsions, bruises, cuts, infections and scratches.

COOPERATION WITH U. S. CHILDREN'S BUREAU

On January 1, 1922, Tennessee accepted the provisions of an act of Congress, known as the Sheppard-Towner bill. Approximately $25,000 (the exact amount based on the population of the state) is made available annually when matched by an equal amount from the local state government, to be used or expended in the state for the prevention of unnecessary sickness, suffering and deaths of mothers, infants, and children of preschool age. The physical defects, dating from childhood, found in soldiers presenting themselves for physical examinations in the World War, and our high death rate of mothers as compared with that of other civilized countries, emphasized the importance of the legislation at that time.

The U. S. Children's Bureau, (a bureau of the U. S. Department of Labor) is the agency for the distribution of this fund. The Division of Child Hygiene and Public Health Nursing, of the State Department of Public Health, is the agency in Tennessee, which receives the money and is responsible for promoting the health of mother and child. One of the conditions stipulated by the U. S. Children's Bureau is that the Division of Child Hygiene and Public Health Nursing shall submit to the Bureau annually, in advance of the distribution of funds, a plan of work for the ensuing year, and it is the privilege of the Bureau to accept or reject this plan. The plan for Tennessee has been accepted in its original form each year. The U. S. Children's Bureau has at no time undertaken to dictate or suggest this plan but has allowed it to be based upon local conditions. An annual report of activities, including personnel, expenditures in various branches of the service and an appraisal, in so far as is possible, of the year's work is submitted to the U. S. Children's Bureau at the end of each fiscal year.

ASSISTANCE TO OTHER DIVISIONS

Sanitary Engineering Division—The Sanitary Engineering Division has been assisted in malaria control work in Putnam county by making investigations of conditions in the vicinity of impounded waters near Falling Water dam.

Health Education Division—Talks have been made to district parent-teacher associations and other lay groups on general public health topics. Films and slides have been shown and demonstrations conducted to impress lessons in better health habits. Literature on various health subjects has been distributed in connection with child health activities.

Local Organization— Fifty per cent of the money contributed by the state for nursing service in the fourteen counties having full-time county health departments has been supplied from the budget of the Division of Child Hygiene and Public Health Nursing. Consultant service in child hygiene is furnished by the staff of the central office and the Supervisor of Nurses keeps in close touch with field nurses by visits, monthly reports and news letters. Charts and graphs have been made, showing the relative death rates of mothers and infants in organized counties compared with those of the state as a whole and the Registration Area of the United States.

Demonstrations in well-baby conferences, and physical examination of supposedly well babies and children of preschool age, have been made in fourteen organized counties. County courts and other interested groups are met at the request of the Director of Local Organization, for the purpose of presenting propositions for extending the scope of full-time county organizations. County-wide examination of school children has been conducted in counties having sanitary inspectors working alone. More than 3,574 children were examined. Of these approximately 2,327 were found defective and the total number of defects was in excess of 4,274.

Division of Epidemiology—The Director of the Division of Child Hygiene and Public Health Nursing was assigned by the Commissioner of Health to make epidemiological investigations and aid local county health officers in the control of smallpox in White, Cumberland and Maury counties; and typhoid fever in Humphreys and Lake counties. Typhoid vaccine was given to 1,152 persons in the flooded districts of Lake county. In response to an appeal for medical aid on account of shortage of medical service in an influenza epidemic, assistance was rendered until other medical aid was secured. Measures were taken to suppress outbreaks of diphtheria in three counties. Local groups, including school boards, physicians, and others, were met and a program of control work outlined, which included Schick testing and administration of toxin-antitoxin to all positive reactors and children of preschool age. The Schick test was given to 823 persons. About 900 persons were given toxin-antitoxin as a direct result of this campaign.

In cooperation with the Director of Epidemiology, the Schick test was administered to all inmates of the Tennessee School for the Blind. The results showed 132 negative and 81 positive. Toxin-antitoxin was given to all positive reactors.

In Putnam county over 100 blood specimens were secured from persons living in the vicinity of Falling Water dam. These were examined at the State Laboratory to confirm the diagnosis of malaria.

Three visits were made to Putnam county to investigate the source of an epidemic of dysentery in which three deaths had occurred in one family.

Vital Statistics—A large amount of time was spent by the Division of Child Hygiene and Public Health Nursing in the campaign for increasing the efficiency of birth registration to the end that Tennessee might be admitted to the Birth Registration Area of the United States. The work included visits to local registrars, physicians and county officials, in 15 counties. The entire nursing service in all counties with organized health service and nurses working alone in three counties assisted in locating unregistered babies.

The Director of this Division was delegated to employ census enumerators in seven counties, for the purpose of listing and checking births by counties. A visit was made to each county for this purpose.

Birth tabulation and other clerical service pertaining to child hygiene was furnished by the Division of Child Hygiene and Public Health Nursing.

Division of Laboratories—The law in Tennessee requires that a 1 per cent solution of silver nitrate be put in the eyes of a newborn baby to prevent opthalmia neonatorum. Since this practice means so much to the future citizenship of the state, the Tennessee State Department of Public Health, through the Division of Laboratories, began to make wax ampules of 1 per cent silver nitrate solution for free distribution to all midwives and doctors in the state in order that no obstacle might remain in the way of the full observance of this law. This 1 per cent silver nitrate solution comes in boxes of four wax ampules each.

Since the State Laboratory began the production of wax ampules of silver nitrate solution in January, 1926, the Division of Child Hygiene and Public Health Nursing has distributed 35,264 ampules.

STUDY OF BLINDNESS TENNESSEE SCHOOL FOR BLIND.

CAUSE OF DISABILITY	No Vision				Partial Vision				Total			
	Preventable		Not Preventable		Preventable		Not Preventable		Preventable		Not Preventable	
	W	C	W	C	W	C	W	C	W	C	W	C
Hyperopia							71	3			71	3
Ophthalmia Neonatorum	36	8			14	1			50	9		
Congenital Cataract			5	2			42	3			47	5
Accident	12	4			13	7			25	11		
Optic Atrophy			13	2			10	2			23	4
Myopia							25	1			25	1
Interstitial Keratitis	4	2			7	6			11	8		
Trachoma	2				16				18			
Phthisis bulbi			7				3				10	
Nystagmus			1				7				8	
Meningitis			4				3				7	
Microcornea			3				4				7	
Buphthalmos			5	1			1				6	1
Alternating Squint							7				7	
Albina							7				7	
Corneal Ulcer	2				4				6			
Staphyloma			5				1				6	
Amblyopia			1				4				5	

Iritis							2	1				
Conjunctivitis					3				3			
Glaucoma			1				2				3	
Smallpox	2								2			
Choroiditis							2				2	
Coloboma							2				2	
Sympathetic Ophthalmia	2								2			
Infection	1								1			
Typhoid Fever	1								1			
Leukoma					1				1			
Other causes			3				6				9	
	62	14	48	5	58	14	199	10	120	28	247	15
	76		53		72		209		148		262	
	129				281				410			

DIVISION OF HEALTH EDUCATION

It has been stated that if the facts known to medical science could be applied in a thorough manner, the span of life would be lengthened twenty-five years and sickness reduced by fifty per cent. Before these objectives can be accomplished, two things are necessary: an enlightened public and an adequate health organization. The practice of preventive medicine, so far as affecting the general population, lags almost a generation behind scientific discovery. The cause of this discrepancy is the failure of the public to understand and appreciate the value of preventive measures. In public health, as in other fields, information travels slowly unless some organization accepts as its responsibility the dissemination of accumulated facts. The Division of Health Education was established for the purpose of bridging the gap between the investigator and the public to be served.

METHODS AND SERVICES

Local Health Service—The most effective method of teaching health is to have established in each political subdivision of the state an efficient local health organization pursuing a program which

A Float Being Used to Carry a Health Message.

touches people daily in their individual and community life. The State Department of Public Health has accepted the promotion of local health service as its primary objective. A complete account of this service appears in the report of the Division of Local Organization.

Demonstration—The several divisions of the department as well as local health organizations conduct demonstrations during which various public health procedures are taught; for example, preparation of food for infants, proper care of excreta from typhoid fever patients, and other simple practices.

Bulletins—In cooperation with the several divisions of the department the following bulletins and pamphlets have been prepared and are being distributed free:

Diphtheria.
Scarlet Fever.
Tuberculosis.
Measles and Whooping Cough.
The House Fly.
Pneumonia, Influenza and Common Colds.
Smallpox.
If You have one Case of Typhoid in the Family, Why Another?
Sanitary Privy Construction.
The Baby.
The Expectant Mother.
Care of the Teeth.
Prevention of Blindness of the Newborn.
Have you a Perfect 32? (Dental Hygiene.)
Clean Mouth—Sound Teeth.
Instructions to Parents (Social Hygiene.)
The Child from Two to Six.
The Results of Defective Eyesight.
The Effects of Decayed Teeth.
The Results of Nose, Throat and Ear Troubles in Children.

In addition to the above publications of the State Department of Public Health, the Division of Health Education has distributed many publications provided by governmental and philanthropic health agencies.

Slides and Motion Pictures—The department owns five projection lanterns, three motion picture machines, and the following films and slides:

Films—

- Malaria.
- Jinks (tuberculosis.)
- One Scar or Many? (smallpox).
- Wellborn.
- Baby's Bath and Toilet.
- Long Man's Short Haul.
- Social Hygiene for Women.
- Men's Lecture Film (venereal diseases).
- Diagnosis and Treatment of Gonorrhea.
- New Ways for Old (diphtheria).

Slides—

- Venereal Diseases. (One set for boys, one set for girls.)

Sanitation—

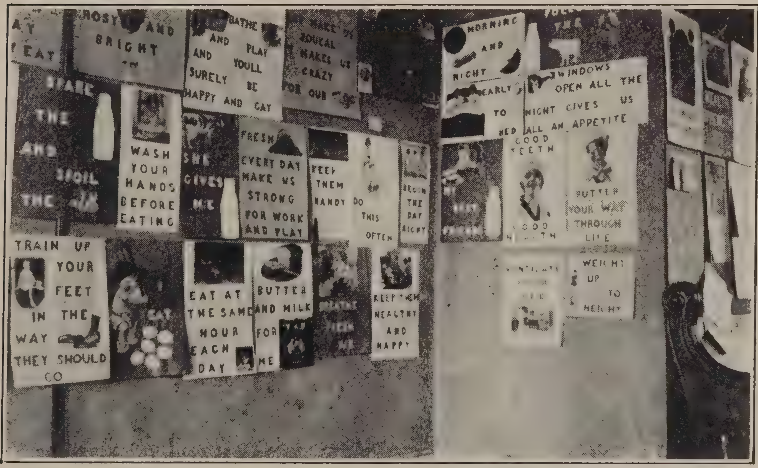
- Excreta Disposal.
- Water.
- Milk.
- Housefly.
- Malaria.
- Miscellaneous.

This material is exhibited by members of the State Department of Public Health and is made available for use by local health organizations.

Exhibits—Suitable exhibits have been prepared each year for display at state and local fairs, community meetings and scientific gatherings. Various public health subjects are presented by means of models, charts, diagrams, lantern slides and motion pictures.

Lectures—Public health subjects were presented to civic and professional groups throughout the state. The subject of child care was presented to groups of parents; municipal problems presented to chambers of commerce and civic clubs, and subjects of special interest to appropriate bodies.

Health Booth at a County Fair.


ROSY AND BRIGHT
BATHE AND PLAY AND YOU'LL SURELY BE HAPPY AND GAY
WASH YOUR HANDS BEFORE EATING
FRESH EVERY DAY MAKE US STRONG FOR WORK AND PLAY
KEEP THEM HANDY
DO THIS OFTEN
BEGIN THE DAY RIGHT
MORNING AND NIGHT
EARLY TO BED
WINDOWS OPEN ALL THE NIGHT GIVES US ALL AN APPETITE
GOOD TEETH
GOOD HEALTH
BUTTER YOUR WAY THROUGH LIFE
TRAIN UP YOUR FEET IN THE WAY THEY SHOULD GO
EAT AT THE SAME HOUR EACH DAY
BUTTER AND MILK FOR ME
KEEP THEM HEALTHY AND HAPPY
WEIGHT UP TO HEIGHT

Poster Contest—School Children Have Prepared These Posters.

Cooperation with Educational Institutions—The facilities of the State Health Department are made available to Vanderbilt University for the purpose of teaching public health to medical students. Several members of the department also conduct special classes in connection with the work of the Department of preventive Medicine, Vanderbilt Medical School.

The facilities of the State Health Department are also available for teaching purposes to the Department of Public Health Nursing at Peabody College. A number of students obtain practical nursing experience in the several county health departments of the state.

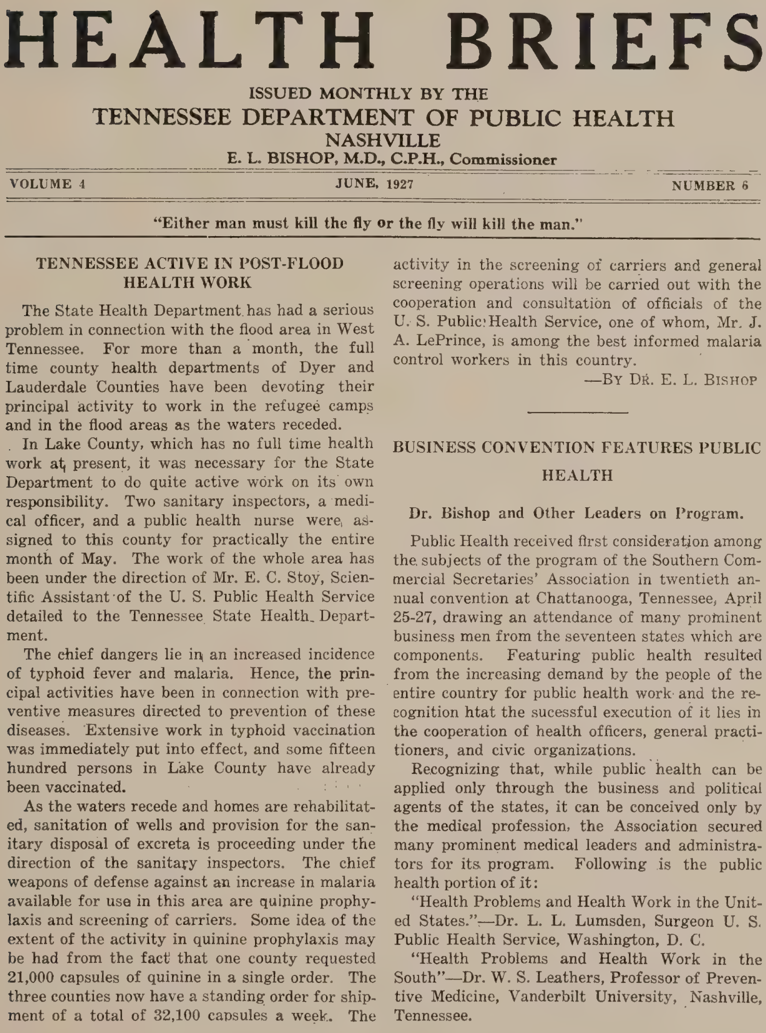
Course for Sanitary Officers—The State Department of Public Health, in cooperation with the University of Tennessee, developed a course for sanitary officers. The purpose of the course is to train men for positions as sanitary officers in local health organizations. Heretofore, men were forced to enter such positions without training since no facilities existed. The course has proved popular and the men who completed it have, by their performance in the field, clearly demonstrated the wisdom of the undertaking.

Library Service—A library has been established in the office of the State Department of Public Health. The most important works on public health are being added to the collection. The members of the department have been induced to contribute their personal journals and periodicals, thereby greatly reducing the cost of maintenance of the library.

Health Briefs—It was felt by many health authorities throughout the state that there should be a medium for expression and by which they could be kept informed on state health conditions, problems and activities. The department, therefore, undertook the publication of such a periodical, the title of which is "Health Briefs."

Printing—The department has purchased a motor-driven multigraph, a mimeograph, an addressograph and a folding machine. A full-time experienced operator has been placed in charge. By the use of these machines, the cost of printing and mailing has been reduced materially. The promptness and facility with which simple printed matter can be produced adds to the efficiency and effectiveness of the department.

FACSIMILE OF HEALTH BRIEFS



HEALTH BRIEFS

ISSUED MONTHLY BY THE
TENNESSEE DEPARTMENT OF PUBLIC HEALTH
NASHVILLE
E. L. BISHOP, M.D., C.P.H., Commissioner

VOLUME 4 JUNE, 1927 NUMBER 6

"Either man must kill the fly or the fly will kill the man."

TENNESSEE ACTIVE IN POST-FLOOD HEALTH WORK

The State Health Department has had a serious problem in connection with the flood area in West Tennessee. For more than a month, the full time county health departments of Dyer and Lauderdale Counties have been devoting their principal activity to work in the refugee camps and in the flood areas as the waters receded.

In Lake County, which has no full time health work at present, it was necessary for the State Department to do quite active work on its own responsibility. Two sanitary inspectors, a medical officer, and a public health nurse were assigned to this county for practically the entire month of May. The work of the whole area has been under the direction of Mr. E. C. Stoy, Scientific Assistant of the U. S. Public Health Service detailed to the Tennessee State Health Department.

The chief dangers lie in an increased incidence of typhoid fever and malaria. Hence, the principal activities have been in connection with preventive measures directed to prevention of these diseases. Extensive work in typhoid vaccination was immediately put into effect, and some fifteen hundred persons in Lake County have already been vaccinated.

As the waters recede and homes are rehabilitated, sanitation of wells and provision for the sanitary disposal of excreta is proceeding under the direction of the sanitary inspectors. The chief weapons of defense against an increase in malaria available for use in this area are quinine prophylaxis and screening of carriers. Some idea of the extent of the activity in quinine prophylaxis may be had from the fact that one county requested 21,000 capsules of quinine in a single order. The three counties now have a standing order for shipment of a total of 32,100 capsules a week. The activity in the screening of carriers and general screening operations will be carried out with the cooperation and consultation of officials of the U. S. Public Health Service, one of whom, Mr. J. A. LePrince, is among the best informed malaria control workers in this country.

—By Dr. E. L. Bishop

BUSINESS CONVENTION FEATURES PUBLIC HEALTH

Dr. Bishop and Other Leaders on Program.

Public Health received first consideration among the subjects of the program of the Southern Commercial Secretaries' Association in twentieth annual convention at Chattanooga, Tennessee, April 25-27, drawing an attendance of many prominent business men from the seventeen states which are components. Featuring public health resulted from the increasing demand by the people of the entire country for public health work and the recognition htat the sucessful execution of it lies in the cooperation of health officers, general practitioners, and civic organizations.

Recognizing that, while public health can be applied only through the business and political agents of the states, it can be conceived only by the medical profession, the Association secured many prominent medical leaders and administrators for its program. Following is the public health portion of it:

"Health Problems and Health Work in the United States."—Dr. L. L. Lumsden, Surgeon U. S. Public Health Service, Washington, D. C.

"Health Problems and Health Work in the South"—Dr. W. S. Leathers, Professor of Preventive Medicine, Vanderbilt University, Nashville, Tennessee.

Registration of Births and Deaths—For a number of years Tennessee failed to gain admission to the U. S. Registration Area for Births because of the inability to secure the registration of 90 per cent or more of its births. The chief cause of the trouble was found to be a failure on the part of local responsible persons and officials to understand the importance and necessity of birth registration. During the latter part of February, 1926, the Director of Health Education began a personally conducted field program of education and devoted almost his whole time to this problem for more than one year. The plan in brief was as follows: In the county selected for intensive work, letters were written to local registrars, doctors, undertakers and midwives, notifying them to meet the Director in the County Clerk's office at a given time (usually ten o'clock). At this meeting the Director would lecture upon the subject of vital statistics, including methods of procuring reports from the doctors, methods of keeping books and the proper use of each blank. A personal visit was made to as many doctors as time permitted, especially to those delinquent in registration. This campaign was made by automobile, bus, railway and horseback; the horse being used in some of the more mountainous sections. Approximately 18,000 miles were covered in a period of 12 months.

Another method of improving registration was inaugurated and in which the Division of Health Education took an active part. A card known as a "school card" was prepared, the form of which is here copied:

THIS BLANK ONLY FOR CHILDREN BORN SINCE
JANUARY 1, 1926

Father's Name ....Color........

P. O. Address ....

Child's First Name ....

Date of Birth ....

County Where Born ....Civil Dist..........

Name..........................
Census Reporter.

In those counties where registration was lowest, all schools were visited and the cards distributed to all children to be carried home to their parents who after filling them out, returned them by the children. The cards were gathered up on the following day and forwarded to the State Department of Public Health.

This was carried out in a great many counties; still registration did not reach the point required for entrance into the Registration Area. As a final resort to promote birth registration in the most delinquent counties, of which there were about 25 in the state, a baby census taker was paid 10 cents to 25 cents per capita to take the baby census. The number of unreported names thus secured was sufficient to complete the requirements for admission to the Registration Area. This vital statistics work was completed about the first of April.

STATUS OF REGISTRATION IN AREA VISITED

Number of registrars in area	816
Number of registrars seen	616
Number of registrars securing complete birth and death registration in their districts	269
Number of registrars not securing complete birth and death registration in their districts	347
Number of registrars issuing burial permits before burial	193
Number of registrars not issuing burial permits before burial	423
Number of registrars retaining copy of each certificate in office	531
Number of registrars not retaining copy of each certificate in office	79
Number of registrars sending in reports by 10th of the month	476
Number of registrars not sending in reports by 10th of the month	140
Number of physicians in area	1,940
Number of physicians visited	506
Percentage of obstetrical cases receiving prenatal care	22⅔
Number of physicians failing to report	87
Number of physicians reporting all births	419
Number of physicians registering births in districts in which they occur	373

Number of physicians registering births within 10 days	236
Number of physicians failing to register	267
Number of physicians favoring vital statistics law	435
Number of physicians opposing vital statistics law	11
Number of physicians endorsing midwife practice	136
Number of physicians opposing midwife practice	364

Number of undertakers or casket dealers in area	463
Number of undertakers visited	204
Approximate number of burials per month	1,853
Number of undertakers receiving permits before burial	101
Number of undertakers not receiving permits before burial	100
Number of undertakers filing death certificate with local registrar before burial	116
Number of undertakers not filing death certificate with local registrar before burial	85
Number of undertakers having difficulty in securing medical certificates	59
Number of undertakers not having difficulty in securing medical certificates	145

APPENDIX

DISASTERS

Cumberland River Flood

The Cumberland river began to overflow during the last week of December, 1926, the rise occupying about one week and the recession a corresponding period of time. The principal flood occurred in the vicinity of Nashville and the neighboring lowlands of Davidson county. A slight rise occurred, more or less, all along the river, affecting to some extent the counties of Clay, Jackson, Smith, Trousdale, Sumner, Wilson, Cheatham, Montgomery and Stewart.

In Davidson county about five thousand people were affected. In the other counties mentioned, about twenty-five hundred people were affected. During the period of the flood they were forced to leave their homes and were cared for in vacant buildings. Clothing and subsistence were supplied by local relief committees, the funds for which were obtained from the Red Cross, local philanthropic societies and subscriptions. During the time of the flood, representatives of the State Department of Public Health made a complete survey of the area, giving attention to all problems having a bearing on public health. Public utilities such as water supplies, sewerage systems, and the like, were not affected. Approximately twenty-five homes were either partially or totally destroyed; beyond this, however, no great damage occurred. The State Department of Public Health made available to local health officers and physicians typhoid vaccine in sufficient quantity to immunize all persons. Approximately fifteen hundred persons were given one or more doses of typhoid vaccine. Calcium hypochlorite also was distributed free of charge. With the exception of seven cases of typhoid fever in the city of Carthage, health conditions were good and there was no increase in sickness that could be attributed to the flood.

Mississippi River Flood

This flood was caused mainly by an overflow of the Mississippi river proper, together with backwater of the Obion, Forked Deer, Big Hatchie and Wolf rivers. With the exception of a short levee in the upper end of Lake county, known as the Reelfoot levee, no flood protective measures exist.

A Flooded Town.

The principal areas affected were Lake, Dyer and Lauderdale counties where approximately 50, 150 and 175 square miles respectively were inundated. The population affected was approximately as follows: Lake county, 4,500; Lauderdale county, 150; Dyer county, 500; Shelby county, 150; and Mississippi islands, 150.

The rise began during the latter part of December, 1926, and the area contiguous to the Mississippi river was subject to overflows from then until July, 1927. The water reached its height April, 1927, covering the area mentioned, then almost immediately began to recede. The second rise occurred about June 10, 1927, and reflooded the entire area. The recession began almost immediately and by July 1, 1927, the water had completely subsided. With the exception of areas in the bends of the river, the rise and recession was gradual and little destruction to buildings occurred.

A detailed survey of the entire area was made by representatives of the State Department of Public Health. They, in cooperation with local health authorities, instituted the following emergency health measures which were necessary to meet the situation: the reestablishment of public water supplies and sewerage systems; emergency chlorination of drinking water; immuni-

Pumping Station for Ridgley Water Supply.

Section of Refugee Camp.

zation against typhoid fever and smallpox; supervision of refugee camps; and the supervision of food supplies.

The refugees were under the care of local relief committees. Camps were established in Ridgely, Tiptonville, Dyersburg, Finley, and Ripley. Cost of relief work was borne largely by the state through an emergency appropriation by the legislature and this was supplemented by funds from the Red Cross and by local subscriptions. In addition to the above, a large camp was established on the fair grounds at Memphis, where approximately two thousand persons sought food and shelter. About 250 of these refugees came from the islands in the Mississippi river and from the Wolf river bottoms; the others came from the adjoining counties in Arkansas, together with a few from the state of Mississippi.

During the time of the flood the health conditions remained unusually good and this is true of the period following the flood, with the exception of a very marked increase in the prevalence of malaria and pellagra. Contrary to expectations, there was no material increase in the incidence of typhoid fever and dysentery.

HEALTH PROTECTIVE MEASURES

Prior to the flood, county health departments were in operation in Dyer and Lauderdale counties. Emergency personnel from the State Department of Public Health were placed on duty in Lake county and one emergency nurse and a sanitary inspector were placed on duty in Dyer county and in Lauderdale county to supplement the existing personnel. Funds for the establishment of a county health department were obtained in Lake county and work is to begin July 1, 1927. A liberal grant of funds made by the United States Public Health Service and the Rockefeller Foundation made this possible. Work was directed toward the combating of typhoid fever, dysentery, malaria and pellagra. An initial purchase of 655,000 grains of quinine was made by the State Department of Public Health and later the Red Cross furnished 1,000,000 capsules. Two hundred and fifty barrels of spraying oil were supplied by the Red Cross to the counties of Lake, Dyer and Lauderdale. Oiling was confined principally to the towns. As a means of combating rural malaria a program of screening was projected, and a factory for the manufacture of screen doors was established at Dyersburg. The cost of the labor and material for the manufacture and installation of the screen doors was supplied by the Red Cross. To combat typhoid fever a vigorous campaign of privy building was inaugurated. Typhoid vaccine was manufactured and supplied free of charge by the State Department of Public Health, for administration by the local health departments and by local physicians. Upon the recommendation of Dr. Goldberger, of the U. S. Public Health Service, dried brewers' yeast and tomato juice were distributed free of charge. These supplementary foods were furnished by the Red Cross.

The entire program, mentioned above, was in full operation at the close of the present biennial period, June 30, 1927.

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